# The buzz about bee biosecurity in Australia

Program overview transcript

(Duration 1 hour 7mins 25secs)

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## Introduction

This is the transcript of a webinar, presented by the Department of Agriculture, Fisheries and Forestry. This webinar explores bee biosecurity in Australia, why it is important, and what is being done to protect our bees from exotic pests and diseases.

## Transcript

[Webinar begins]

Richard Keane: Hello everyone, and welcome to the Australian Biosecurity Series webinar, the buzz about bee biosecurity in Australia. This is hosted by the Department of Agriculture, Fisheries and Forestry, and you're very lucky today. You've got me, Richard Keane, here facilitating today's forum. Thank you everyone for taking time out of your busy schedule to join us. But before we start, I'd like to acknowledge the traditional custodians of the land we are meeting on. And for us here in Canberra, it's the Ngunnawal people. I acknowledge and respect their continuing culture and the contribution they make to the life of this city and this region. I extend that recognition to the traditional custodians of all other lands on which our staff are gathered today and to all Aboriginal and Torres Strait Islander people attending today's fantastic event. Today's webinar, as you can see behind me, will focus on bees, the quiet achievers of the agricultural world.

Not only are bees responsible for providing us with honey, but they contribute to producing almost all the foods we enjoy. This webinar will bring together some of Australia's bee biosecurity experts for a deep dive into the world of bee pests and disease, and what we can do to protect our hives. To start today's session, we are going to hear from Danny Le Feuvre, CEO of Australian Honey Bee Industry Council. Danny will provide a perspective on the honey bee industry, why biosecurity is important to this industry and how we fund biosecurity activities. You can also see on the screen there that we've got Dr. Jenny Shanks, who's the Manager of Bee Biosecurity and Surveillance at Plant Health Australia. Dr. Shanks will outline the bee programs aiding bee biosecurity in Australia and the future of bee biosecurity. We also have a pre-recording from Dr. Chris Anderson, Manager of Plant Biosecurity Prevention and Preparedness at the New South Wales Department of Primary Industries who led the New South Wales Varroa response and will be detailing how they have responded.

Our final presenter is Tara Needham. She's a Veterinary Officer with the Avian Biologicals Companion Animal and Dairy from the Department of Agriculture, Fisheries and Forestry. I'm glad I could say all of that. Tara will discuss the import and export of queen and package bees. Once we've concluded all of that, we'll then go into a series of Q&A. So please take the time to put any questions that you may have while we're doing all of this, and we'll look to try and get through as many of those as possible. We also have a very special guest panellist joining us today, Gunter Ebert. Gunter is the Director of Biosecurity Reports and Response at the Department of Agriculture, Fisheries and Forestry. He'll be available to answer questions about border and post biosecurity detection measures. A significant amount of Australian food that ends up on our plate is dependent on honey bee pollination, so honey bees are very important for us here in Australia. And we're going to kick off today's session with a short video from Plant Health Australia about the importance of honey bee biosecurity. Thank you.

[Video begins]

Voiceover: Australia's honey bees is some of the healthiest in the world, free from many of the pests and diseases found elsewhere. Australia's honey bee biosecurity system plays a crucial role in protecting the health of our honey bees. Honey bee biosecurity is a set of measures designed to protect your honey bees. Every beekeeper, whether you own one hive or a thousand, and every person visiting or working in an apiary has a role to play in protecting honey bees from established in exotic pests.

A healthy population of honey bees ensures the success of the honey bee industry and the many plant industries that rely on them for pollination. Every pest or disease that enters and becomes established in an apiary has the potential to increase the costs for additional monitoring, chemical use, and labour. Colony yield and performance may decrease, and valuable markets, particularly overseas may be lost. Being familiar with normal honey bee behaviour and productivity of your hives will help you to spot anything new or unusual. Keep notes and photographs of what you see and report anything unusual. The code of practice has been endorsed by the industry to help both professional and hobby beekeepers to meet their obligations in bee biosecurity. If you see anything unusual on your bees, call the Exotic Plant Pest hotline on 1800-084-881.

[Video ends]

Richard Keane: That video certainly highlights the importance of bee biosecurity. And without further ado, I'm going to hand over to our first presenter. Danny Le Feuvre, if you could please kick us off today. Thank you.

Danny Le Feuvre: Thanks a lot to the team for inviting me along today. I think it'll be a great set of presentations. So I've been given a real tight timeframe, so 8 to 10 minutes to try and give everyone an oversight to the honey bee industry. So strap in, we're going to race through this. So the National Honey Bee industry, there's 48,000 registered beekeepers across the country, so that's commercial beekeepers, recreational, from all walks of life to some of our biggest producers that have bees. Those 48,000 beekeepers are managing around 855,000 beehives, and we're seeing that increase every year as we move forward. You can see on the map I've got there, that the red markings on that map showing where those bees are located in Australia. So we have managed colonies right across Australia. Those bees are producing a farm gate value of 437 million dollars and that's just the farm gate, not the retail value.

So that's from honey production, raw beeswax, queen sales, those sorts of things. But where the honey bee industry is really important and it was alluded to in that video just previously, it's the pollination services that we provide. So all the other ag industries. So there was a study done published in 2018 that looked at all the pollination that managed colonies and wild and feral bees contribute to the ag industry and it was estimated that there's a 14.2 billion dollar contribution the honey bee industry makes to the 83 billion dollar ag industry. So we are only a small cog in the wheel of ag, but we are really important. And the reason we're so important is that we know that 65% of all hort and ag industry or all hort and ag crops require some sort of pollination to achieve yield. And we know honey bees are the most common pollinators in the landscape currently.

So we've got beehives managed colonies right across Australia from the Channel Country way out the back of Queensland, down to the Spotted Gum forest of Southern New South Wales and even the Marri and Jarrah in Western Australia or the famous Leatherwood that's found in the ancient Tasmanian rainforest down in south. Our honey bees are spread right across. Australia's really lucky to have some of the most diverse nectar producing flora in the world. Now that means that our beekeepers produce a whole range of honeys from the Blue Gum in South Australia or the Yellow box in Victoria and New South Wales, or even the Stringy Bark found along the Eastern Seaboard and even some of the really special medicinal honey that our industry produces, including honey from our native of manuka bushes or the Jarrah forests of the west or Leatherwood in Tasmania.

We have a huge range of really unique honeys that we produce and I think the consumers don't really get to see the full range or appreciate the different varieties that we are able to produce. But this really diverse range of floral species in our landscapes really promotes healthy bees. So the Australian honey bees are the most healthiest in the world. We're seeing reports from around the world of honey bees declining and in dire straits. But the Australian honey bee industry is strong. Our honey bees are really healthy and that's only because we're able through our biosecurity measures to keep a lot of the pests and diseases out of our country that most of the rest of the honey beekeeping world has to deal with.

So that means that our honey bees, we don't need to treat them with any pesticides to keep mites out or anything like that. And what that results in is that honey that I talked about being some of the most diverse honey that we see in the world, is also the best honey. So the honey we produce doesn't have any pesticides because we're not using it in our hives, we're deriving most of our honey from native flora, some of the most pristine forests in country and native vegetation in the world. And it just produces such a quality product that we totally underestimate as Australians and how lucky we are to have pure Australian honey.

We're going to hear a lot today about Varroa mite and the incursion in New South Wales. And whilst that's critically important for our industry that we do eradicate and keep the mite at bay and out of Australia, we've also got to remember that there are a number of other pests and diseases around the world that we don't want in Australia. So it's really important whilst we're still focused very much on Varroa currently that we don't lose sight of how important it's to maintain our biosecurity systems in Australia for the honey bee industry. So there's a big range of really strange pests that we don't want, Asian hornets and large hive beetles, that we just don't want in our industry and we want to maintain ourselves is that really clean, high quality product that we produce and make sure that our bees are so healthy that we can provide the pollination services that we are currently doing for our industry.

This map, although it's from 2020 and we've had some rationalisation since then, just demonstrate how important a national biosecurity program, and Jenny's going to talk in depth more about the programs that we are doing. But this is just highlighting that there are so many points of entry across our country, and that any program that we have has to be big, it needs to be well funded and it's really quite complex. And when you combine the amount of points of entry we've got with all those potential pests and diseases that are highlighted before. It really means that we've got to focus heavily on having multiple methods of surveillance and not rely on just one way of looking for pests. And the system we are using at the moment, and again Jenny will deep dive from this, but we are using multiple approaches. So catch boxes at ports, sentinel hives that have bees inside to catch diseases and pests and identify them, take sample those bees and take them to the lab and dissect them looking for pests.

We're even using technology where we've got smart catch boxes that use cameras to close a door and notify the authorities that something's there and they need to look at it to the very manual methods of alcohol washing and floral sweep netting that are age old and tried and true and tested ways of testing for mites. And the other picture there is looking as when the bees are taken back to the lab, they're dissected and pulled apart to look for internal parasites as well.

So it's a really diverse way we look and manage our biosecurity for our industry, but our industry takes biosecurity so seriously that we developed our own biosecurity code of practice. With help from PHA and the jurisdictions, we've put together a manual for all beekeepers to use and it's a manual about the best practice biosecurity that's going to protect every individual business, not just from exotic pests and diseases coming into the country, but even from those endemic ones that are already here, and ensuring that each business does their own little bit to protect the whole industry as well. So this is mandated in various degrees across the country, but publicly available for all beekeepers. And I encourage everyone to get a copy of that and have a look.

We've taken it a step further than just producing a biosecurity code of practice. As an industry, we've utilised those geographic barriers across our country to limit the amount of movement of honey bees across Australia, which is going to prevent and slow and spread of internal pest and diseases that we have endemic to this country. So we have a five zone policy where Australia's been split up into five areas for the honey bee industry where bees can't transfer in between without going through certain permits or protocols to ensure that we limit any spread of diseases and pests within Australia. So we have Northern territory, WA, KI, Tasmania, and then the Eastern Seaboard as five different zones. So we take biosecurity really seriously as an industry and biosecurity matters for us and hopefully this really quick highlight across the industry is demonstrated the honey bee industry is worth protecting and it is worth investing in for biosecurity.

And I've always been told that honey bee security equals food security. So we've got to keep in mind that also if we don't protect our honey bees, we are going to have problems providing food security. And for those guys out there that aren't beekeepers and want to support the honey bee industry, the best way you can do that is make sure that when you are buying some of that brilliant honey that I talked about off the shelves from Australian supermarkets, that you are ensuring you buy 100% Australian honey. That's how we're going to ensure that we've got a prosperous and healthy industry moving into the future. So thanks for your time and I look forward to listening to the next presentations.

Richard Keane: Thanks, Danny. That was a great overview of the Australian honey bee industry. And now I'm going to hand over to Dr. Jenny Shanks who's going to provide us with some details about the National Surveillance program. Dr. Shanks, over to you.

Dr Jenny Shanks: Thanks so much for the introduction. Before I start, I would also like to acknowledge the traditional owners of the land in which we meet today and pay our respects to elders past, present and the future. Following on from Danny, I'm going to continue our bee biosecurity journey today with my presentation providing a bit of an introduction to Plant Health Australia. Danny did mention us a couple of times there, so I'll delve into that a bit further and I'll also cover some of the various programs, training and resources that we manage and produce which support the industries and government which we work with. Before I'll go any further though, I will just say that I won't be covering the Varroa destructor response surveillance based activities. We have New South Wales coming up after me who will cover everything, but you can also get additional information from the QR code on your screen.

What I will highlight, however, is that the Varroa destructor mite was detected in the sentinel hives at the port, which are a part of the National Bee Pest Surveillance program and it's this national program that I will cover in further detail today. Plant Health Australia is the trusted coordinator of the Australian plant biosecurity system. We bring together expertise, knowledge, and stakeholders to generate solutions that improve biosecurity outcomes to ensure the plant biosecurity system is future-orientated and solutions-focused. We believe a strong and resilient plant biosecurity system is built on connected strategies and partnerships, effective and efficient response and recovery and leverage data and technology for improved decision-making and rapid response to biosecurity threats. So let's go into surveillance. Australia is vast, as we are all extremely conscious of. With a coastline stretching 60,000 kilometres, there's a variety of pathways for those exotic pests to enter, move and spread.

And surveillance is critical in finding these pests early, providing time for us to act before they become widely established. Surveillance supports market access, can be used to define range, and the data generated can improve our decision-making. Surveillance for bee pest has occurred since the late 1990s for quite some time now. And over this time, various reviews, risk assessments and statistical analysis have taken place to support and guide the objectives of what our teams plan to do in the field, and the types of activities that are taking place, whilst ensuring an aiming to achieve a risk-based approach to the program design that are undertaken, and adequately ensure that resourcing is supported for the delivery across the program. The National Bee Pest Surveillance program is an early warning system to detect new incursions of a wide range of pests. The current National Bee Pest Surveillance program is funded by Hort Innovation using levies from 14 horticultural industries with co-investment from Grain Producers Australia, the Australian Honey Bee Industry Council, and the Australian government. Plant Health Australia manages the national program contracting to state and territory governments to deliver the surveillance activities at identified locations.

So you can see that this really is a partnership between industry and government. The program currently consists of eight high risk ports identified in red and 16 lower risk ports identified in blue. And as Danny alluded to from his presentation, we've recently undertaken a bit of a review of the program and tried to ensure that we have that risk based approach, that we have the right resources and teams deployed at the right locations so that we can definitely be on the ground in the field to capture those high risk pests coming through. Across these ports, dependent on the location, the risk profile, climate, and the types of target pests, a range of different activities, techniques and tools can be undertaken. So what we might do up in Darwin is vastly different in some respects to what we do down in Tassie, for respects to the type of pests that might come in.

So Asian honey bee is a high risk for Darwin, versus the climate down in Tassie really dictates what the activities we could do. Sentinel hives are primarily there to target the major exotic pests, Varroa mite, Tropilaelaps mite and tracheal mite. These strategically placed hives are routinely inspected manually, as Danny said, getting out there in the hive, opening it up and having a look at the bees. We collect samples and send it off to a lab for further tests or we expose the hives to acaricides to knock down any mites that might be inside. Other activities can include catch boxes, sweep netting, pheromone ballooning or the examination of rainbow bee-eater pellets. All of these aiming to detect new incursions of bee species. So Asian honey bee, dwarf honey bee, giant honey bee. And the reason why we target these actual bees is not only could they cause displacement to honey bees, but they themselves can carry Varroa mites, tracheal mites, Tropilaelaps mites.

So we're targeting a whole group of pests and as Danny mentioned, there is quite a number. 13 in total target pests are in the program, and because of the range of techniques and tools that are used, large volumes of data is generated. Currently 83,000 data points are in AUSPestCheck, which can support Australia's proof of freedom claims. To support bee biosecurity nationally, PHA works with industry and government to produce relevant resources.

19 standard operating procedures for bee surveillance have been developed as well as a quick reference field guide and online bee surveillance training courses. All of these aim to assist jurisdictions to deliver nationally consistent activities, adding confidence to the national program's outcomes. As Danny mentioned, we also have the Australian honey bee industry biosecurity program which assists beekeepers implement best practice in their hives and apiaries. So collectively, we're all working together for one outcome. And further to this, a targeted online training course specific for beekeepers has been revamped to produce a more interactive experience to learn about bee biosecurity, pest and diseases, inspection techniques and where beekeepers need to report if they suspect something in their hive. So again, collectively we're out there looking in the hives to ensure that we have early detection.

PHA also works with new and emerging industries to raise awareness for biosecurity, pest threats, and best practice. Earlier this year, several fact sheets were developed with the Australian native bee industry covering the areas of biosecurity growing the numbers of individuals aware of the biosecurity system. There continues to be more to develop, improve and achieve in biosecurity preparedness, but where to next for bee biosecurity? This could include continuing to build surveillance networks and partnerships, assess the learnings from the Varroa incursion and look at resourcing adequacy and the investment, what needs to be achieved for the long term objectives of the National Bee Pest Surveillance program. I'd like to acknowledge the collective PHA industry and government teams that work together for bee biosecurity. And I'd also like to highlight some of the socials where you can connect further with us at PHA. And thank you very much for giving my spiel on bee biosecurity.

Richard Keane: Thank you very much, Dr. Shanks. And it's great to see all those programs in place to protect our bees and I particularly like those QR codes as well. They're excellent. Just before we throw over to the next presenter, if I can just remind everyone down the bottom there, you've got the Q&A box. You can put in any of the questions that you may have or want to pose to anyone who's presenting here today. So please make sure you get your questions in nice and early. We've got a pre-recording for the next one. Our next presenter is Dr. Chris Anderson. He's going to be discussing New South Wales Varroa mite response. Unfortunately, he was unable to join us here live today, but to answer your questions on the Varroa mite response we have Joanne Cuming. Thank you, Joanne, for coming today. She's Public Information Officer for the State Control Centre and please direct any questions at the end there or put them in the Q&A box. I'll throw over now to the presentation. Thank you.

Dr Chris Anderson: Thank you very much. My name is Chris Anderson and my role at the moment is New South Wales DPI and Varroa Response Coordinator. So I thought I'd just take this opportunity to run everybody through a bit of the background on the response and the approach that we're taking and then perhaps give you an update on where we're at. But a critical part of today's talk will be explaining the purpose why we are doing what we're doing. So what you can see there is quite a historical photo. That's the first photo ever taken of Varroa destructor from Australian beehives on the Australian mainland. And that was taken by Lauren Drysdale, our acarologist here at the Orange Agricultural Institute, and that was taken at 11:00 AM on June the 22nd this year.

That photo resulted in a whole series of events that have culminated into the response that you would all be familiar with today. What this image is a map just showing some of the surveillance hive locations that we have been running in New South Wales. And these are part of the National Bee Pest Surveillance program. And it was the hives here at Newcastle that we've found to be invested. Two hives were found to be invested with Varroa and those mites in that image are from those heights and here are some of the surveillance hives sitting at Newcastle. This picture was taken the day after the hives at that particular location had been euthanized.

So on the same day, we declared an emergency order and this was the series of quarantine zones that we put in place. And as you can see there's the red zone, which is the 10 kilometre circle around IPs and then the purple zone here, which is the surveillance zone where we do high intensity surveillance. And then at that point in time we also had a standstill zone in place because we didn't really know how far it had spread. And so we would mitigating that risk by preventing hives from moving any further away if we had found that it all moved further out.

So by Friday the 8th of July, as you can see, the number of red zones and purple zones and yellow zones had grown significantly. And it was also on that day that we finally got National Management Group approval for a 100 day response plan. And the aim of this response plan was to eradicate known infestations to facilitate limitation and to minimise impacts on business continuity. So what I'd like to do now in the time that I've got is run you through some of the unhelpful myths and bust a few of these that we get. We often get questions around why we're killing hives that we've done surveillance on that are not infested. So people will make comments like why hives are not infested. So they don't pose a risk and you shouldn't be eradicating them. We constantly being criticised DPIs using a sledgehammer to swat a fly or maybe a bee and just treat all the colonies with miticides to avoid killing them so that you don't have to kill any bees.

There's a lot of people out there who are very sensitive about euthanizing bees, but I hope that what I can do now is explain the reasons why we have to do the things that we're doing and put some real perspective over all of this because there's a lot of alarmism out there. So if the Varroa mite were to establish in New South Wales, it will spread rapidly across Australia within a matter of years. And as it spreads, it will heavily infest managed beehives and wild honey bee colonies. So all European honey bees will become infested by mites and any colony that is uninfested now will quickly become infested and die in the near future. So that's why we need to remove all of the colonies around points of infestation because every single colony can become a bridge for mites to move through the environment.

As Varroa numbers climb in a colony, the impact of the associated viruses will become notable and this reduces even further the time that Varroa takes to kill a colony. So it's often said that Varroa alone and viruses alone are a problem, but they're nowhere near as bad as when you put them together because the Varroa exacerbates the impacts of those bee viruses. So as wild honey bee colonies are lost throughout our landscape as the Varroa march continues, the multi-billion dollar contribution in pollination services that these colonies provide to pollination reliant industries will be lost and it will be lost. This is the experience of every country where Varroa has come and invaded. There will be an urgent need to replace this service through managed beehives, so bees that are managed by beekeepers, in order to maintain current yields. That's just current yields that our horticultural industries produce.

Australia currently does not have enough hives to make up for the loss of wild colonies should Varroa escape and it may take several years until sufficient numbers can be built up in the locations where they're needed to ensure that farmers are able to continue to produce and it's this point about the location that is really important. Australia is a very, very big country, it's a continent and we produce food in very disparate locations. So there are large distances between our food production regions.

So we need to build up these to do that pollination in all of these food production regions or we will lose out on food production. Moreover, these hives will be provided at significant cost to farmers who currently rely on the free services that are provided by wild honey bees. And this will further add to the cost of food. Prices are already going up left, right and centre in this country at the moment and right across the world and the introduction of Varroa into the Australian ecosystem will put additional upward prices on food because of the cost that food produces will need to pay for pollination services that they don't currently pay for.

An interesting side note, the New Zealand experience has shown that many horticultural operations will need to expand into beekeeping to remain viable. So a lot of these big companies, seed producing companies for example, have had to become beekeepers because they simply cannot source enough bees from outside of their operation to do the pollination jobs that they need to do to remain viable. Treating a hive may control Varroa in that hive for a time, but it does not give confidence of 100% mite kill and it is impossible to treat all the wild colonies to ensure eradication. So Varroa is an obligate parasite. The only way to eradicate the parasite is to delimit its spread and then remove its host from the areas where the parasite is present. That's how the science works. So putting some perspective around this and quelling some of the alarmism that we hear out there, the red infested area where Varroa is present, a lot of people don't know this, but the area that we are removing bees from is 0.65% of the area of New South Wales and 0.07% of the area of Australia.

So it's a tiny, tiny area and the number of hives that we're euthanizing to prevent the catastrophe that I've just outlined is approximately 2.7, potentially up to 3% of the Australian hive count at present. It's a small number, but it will be sacrificed for the greater good. And so that explains why we are undertaking such a massive collaborative effort. We've had 35 years of work in 140 days from over 1,700 people. It's a huge effort, nothing like it that I can remember in the history of DPI responses. We've had 28,000 hives surveyed by government, more than 200,000 hives surveyed by industry, 102 detections that 0.04% of hives that have been looked at have turned up positive. 98% of cases and 97% of hives euthanized in the red zones. And that gives us 99.99% confidence that Varroa is delimited to those red areas.

So what does the road to successful eradication look like from here? Well, we're looking at eradicating Varroa in wild bees and this is remote baiting with some of the images below of that process, continuing to demonstrate no spread into surrounding surveillance zones, verifying successful eradication in red zones through the sentinel hive surveillance program that we will start once we're confident that we've removed Varroa, and then facilitating owner reimbursement costs and reducing quarantine and restrictions where supported by the science. So we're all about trying to get the industry back on the road as quickly as possible and Varroa free. Thank you.

Richard Keane: Thanks very much, Dr. Anderson, for an interesting presentation there. Our last presentation today is by Tara Needham and she's going to be discussing the import export of queen bees. Over to you, Tara.

Tara Needham: Thank you very much for the introduction. As introduced, my name is Tara and I'm a veterinarian by trade and I work as a Veterinary Officer in the Animal Biosecurity branch. I'm also an amateur beekeeper myself. Now bees, like any animal, can carry pest and diseases that we absolutely don't want here in Australia. However, the movement of bees across borders is important for the honey bee industry. So we have specialised quarantine protocols and health requirements in order to protect Australia. Now bees can come into Australia in two different forms. You can either come in as queen bees and escorts. Now queens are fairly rubbish at looking after themselves. So in the hive they're constantly followed around by attending nurse bees to feed them, water them, groom them, and constantly attend to their every need. So when in transit, we send queens with half a dozen to a dozen nurse bees in order to provide that service.

They can also come in as bee semen. Sounds crazy, but reproductive technologies have improved significantly over the past 10 years and artificial insemination of queens has become increasingly more commonplace. Now, as Danny mentioned, Australian bees are known for their favourable international health status and we, Australia, export live queen bees and escorts, but also package bees which are essentially an instant working colony. Now you can see an example of a queen's transport box as well as a typical package bee, which is essentially about 1.4 kilograms or roughly 12,000 bees within accompanying queen.

Now you might ask why would we want to import bees and genetic material into Australia if there is a risk associated with that? Now humans have been keeping bees for roughly 10,000 years, which is comparable to the domestication of cattle. And over that time we've been selecting bees for favourable characteristics such as honey production, quietness, and in more recent years, a great emphasis on disease resistance. Now the import of bees allows for the transfer and improvement of genetics, which is particularly important to an island nation like us, which then subsequently allows for the improvement of production which can be measured in many ways, whether that be honey production, long lived and productive queens, or resistance to disease and pests. In terms of exports, most of our exports are dedicated to the fast replenishment of bee populations and those being healthy bee colonies. A number of our trading partners face bee disease challenges that result in large losses of hives over the year.

Now, the importation of live bees is a really carefully managed process, and carefully controlled as well. In fact, the importation of live queens was actually suspended in 2008 due to severe and valid concerns regarding the rise of Varroa mite overseas and the emergence of colony collapsed disorder. Now a review was undertaken in 2012 and importation resumed again into the Eastern Creek quarantine station with new fast stricter quarantine requirements.

We now have a specialised bee quarantine station at the post entry quarantine centre in Mickleham in Victoria, and it welcomed its first importation of queen bees from the Netherlands in mid-2021. Now, the list of diseases and pests that Australia is concerned about is really rather long. And to cover just the increasing number of viruses, I'd need a whole another presentation. However, the main ones we are concerned about are obviously Varroa mite, tracheal mite, which is a microscopic mite that lives in the breathing tubes of bees and is present across much of the world, trops mite, which is a similar mite to Varroa but much smaller, as well as Africanised bees and Cape bees, which in simple terms we can think about the delinquent cousins of our European honey bees.

Now Australia has some of the highest quality bees in the world and we export over 15 tonne of live bees every year. And these bees go to a number of different countries across the world, including the Middle East, Oceania, and North America. Currently, Canada is our largest importer of Australian bees and this is mostly in the form of package bees. Now, the total value of queen bee and package bee exports is valued at approximately 2.5 million Australian dollars. Now this makes up a relatively small but very important slice of the pie in the value of the honey bee industry to Australia, and I hope that gave you a nice quick snapshot into the important export of our Australian honey bees.

Richard Keane: Thank you very much, Tara, for that excellent presentation and we are just getting towards the start of our Q&A session, but that was an excellent lineup of speakers and thank you to everyone there who's been able to take time out to provide some excellent insights into the varied programs of great work that you're doing there. So special thanks to Danny, Jenny, Chris and Tara. Also, just like to highlight we've got a couple of guest panellists, Gunter and Joanne who are available for any of the questions that you may have. Guntar, thank you for joining us and just grateful if you can tell us a little bit about your role and the scope of the work that you do. Thanks.

Gunter Ebert: So as Rich mentioned, I'm the Director of the Biosecurity Reports and Response section within DAFF. Our main priority is to respond to reports of detections, biosecurity risk material, which includes exotic bees found past the border. When we respond to those, our main objective to start with is to contain the risk, then manage the risk, find out what was the cause of the risk coming in, and then putting things in place to make sure it doesn't happen again. These reports come to us from members of the public and industry in various ways, including our sea secure at port hotline, which I'm hoping we can provide later or through our report at biosecurity concern weblink.

We have dedicated teams in each state that respond to these reports as a priority. So as soon as we receive those reports, same day, we coordinate those reports getting out to the teams in the regions so that they can respond to those immediately. We work closely with the National Board of Surveillance program who have surveillance staff based in all locations around Australia and they respond directly to swarms when they're reported or they coordinate the capture of those swarms using licenced pest controllers. Just as an aside, since 2017, they've captured over 200 swarms, either at or nearby security entry points around the country and these have been analysed for the presence of bee mites including tracheal mites.

Richard Keane: Thanks very much, Gunter. I can say quite a few questions still coming through, so we'll try and get across to them. And going back to our original presenter today, Danny, question here saying how are beekeepers travelling today at the moment with Varroa, floods, and cold weather? I'm not sure if you want to answer that but over to you.

Danny Le Feuvre: Yeah, we're really getting whacked at the moment like all agricultural industries and yeah, it's been a really strange season for beekeepers right across the country. It's been colder than usual and definitely wetter than usual across the Eastern Seaboard. So if we look at the beekeepers that are affected by the Varroa response but are in the red and purple zone, but they're really doing it tough.

Some of these guys are losing hives that they've put a lifetime working to, all to try and for the betterment of the industry. So definitely a big shout out to all those beekeepers in the red zones that have really sacrificed in this response. It has been definitely appreciated by the industry. Generally across the Eastern Seaboard, beekeepers are just finding it so wet at the moment. The honey production's down, the prices aren't going up, the honey prices at the farm gate are still maintained at low prices. We're seeing high levels of imported honey coming into the country at very low prices as well. So yes, our industry is doing it tough at the moment, but it's a resilient industry and we will pull through to the other side and come out stronger.

Richard Keane: Thanks very much, Danny. Next question is for Joanne, who's online there. Thank you for New South Wales DPI, that information is great. Can we have more regular updates about the Varroa response that might go some way to address concerns?

Joanne Cuming: Absolutely, we can take that on board. We have been focused obviously on updating with regards to this response operations as they've been progressing in terms of looking at the reinforcing the purpose and the rationale behind the response approach. We can certainly take that on board.

Richard Keane: Next one here is for Dr. Shanks. What are the impacts of Varroa mite on native bees known and are European bumblebees impacted by Varroa?

Dr Jenny Shanks: Yeah, thanks for that question. It's one that does come up quite a bit, as more people are aware of our wide range of native bees here in Australia. The Varroa mite has developed a really strong evolved connection to the honey bees. It has developed its reproduction based on the structure and the reproduction style of the honey bee colony. So a lot of our native bees are solitary, they live by themselves, they live underground. The ones that do live in colonies are so small and have a very different type of reproduction inside their hives that the Varroa mite just doesn't reproduce itself within those situations.

So no, there is no evidence that Varroa mite impacts our native bees. And also with bumblebees, there is some information out there that Varroa mite might be carried on bumblebees, but it's the same deal. It doesn't cause any reproductive impacts. Varroa mite, as we all know, does transmit a virus called deformed wing virus to honey bees and there is some information that deformed wing virus can get across to our native bees. But again, the vector being for Varroa mite isn't going to be there in play to get that across to our native bees. So impacts are non-existent.

Richard Keane: Perfect, thank you very much. Throwing back to Gunter again, what measures will be in place for early detection of other pest species for Australia nationally?

Gunter Ebert: So our section who looks after the post biosecurity detection reports, mainly working off of public reports and industry reports, making sure that we can respond to those quickly and effectively. There is also some additional work going on with some innovative detection technologies using AI and cameras on key cranes that are used to offload containers off the vessels. And this will be set up to detect biosecurity risk material, which includes bees again on the external surfaces of containers as they're being offloaded from vessels. This is ongoing work at the moment and we've also recently trialled the use of eDNA technology to detect the presence of Varroa structure in feral hives. This technology was initially trialled on the known positive hives from the control zone and eDNA reliably detected the presence of Varroa in these hives even when infestation levels were known to be low. So the department's obtained eDNA technology in some of its labs and will be further testing the utility of this technology for bee screening and for other significant pests. I hope that answers the question.

Richard Keane: Of course, it does. Thank you very much, Gunter, and that's excellent to hear about the new tech as well, always opportunities there. And next question goes to Tara, who's in here with me today. What are some of the main challenges that Australia faces when importing and exporting bees?

Tara Needham: So certainly in terms of importing bees, pests and diseases are the main concern when we're considering bees coming into the country. And that certainly comes into the pros and cons of the movement of any animal across borders. The big challenges are the diseases and the pests that are much harder to pick up. Good thing about Varroa, it is a mite you can see with your naked eye. It's small, but you can see it. So pests like tracheal mites, which are so tiny, they live inside the breathing tubes of the bee are much more difficult to pick up and certainly in the quarantine protocols there are ways that we're able to do that, to be able to check bees coming into our station that they are free of that.

And things like viruses and things like that that we absolutely also don't want to have floating around in our industry. In terms of exports, as Danny alluded to, we've got a couple of different bee diseases that we have here in Australia. So in terms of exporting bees, we actually look to enable other countries to source bees from areas that are free of those diseases so that we can make sure that we offer the highest quality bees to our trading partners as possible.

Richard Keane: Very good, very good. Got quite a few questions coming through so I'll try and get across as many as we can. Danny, the next one is for you, and it's a two part question, so hold on. It's about Purple Hives. Where has the Purple Hives project got to? I hear that it is stalled, waiting on why to go ahead, and would Purple Hive give quicker and more useful feedback? Over to you, Danny.

Danny Le Feuvre: Yeah, thank you. Yeah, the Purple Hive, just for people that aren't aware of it, it's a new technology that's utilising cameras and AI algorithms to be able to video bees coming in and out of the hive and detect the presence of Varroa mite. And like Gunter described, eDNA is a new tech for surveillance and when this incursion happened my inbox became very full of a lot of new tech for surveillance that is out there as well. So we have been inundated with all manners of new technology.

Purple Hive is probably one of the most well known and specific surveillance tools out there and evidently is quite good. We've not seen any trials or demonstrations of that as yet. So we have got a team in the DPI that is looking through all the different technologies and assessing them on their ability to be able to assist not only in the response but also as a potential for surveillance tools into the future. So we are working through all the new technology that's appeared in our inboxes in the last few months and trying to navigate a way forward. Purple Hive is definitely amongst those and something we're definitely looking at to see if we can implement it into the future as well. But identifying that it does only pick up that one pest species and there's a lot of pest species that we need to be doing in surveillance as well.

Richard Keane: Thanks very much, Danny. Our next question is for Joanne. What is the expected duration of exclusion of managed honey bee colonies in the current Varroa red emergency zones?

Joanne Cuming: Yeah, so the expected duration is three years in those zones for the exclusion that's in accordance with the current agreed response plan.

Richard Keane: Nice and easy. Thank you. Next one is, I think we're going to go to Dr. Shanks for this one. Is there one surveillance method that is more efficient or effective than another?

Dr Jenny Shanks: Oh, how long do we have? Look, it really does... Great. Fantastic. Look, it depends on the pest that we're looking at. So each technique, tool, diagnostic method that we undertake in surveillance, and it's not just the national program, it's also if we need to undertake work at our borders, if we capture a swarm or in a response situation, it's dependent on the pest. So thinking about sentinel hives, so the active beehive that we look at regularly in that hive, we can undertake anywhere from, off the top of my head, six different types of techniques on that hive to pick up seven different pests. So it's not just that mite that's living on the back of the bee, it's also the mite that we see in the throat of the bee. It's also the viruses, it's also any beetles that are on the frames. It's also anything else that lives on the frame.

So depending on what you're looking for, there's a tool or a technique that's been tested overseas where the pests reside and have been reviewed extensively here in Australia to ensure that we're actually undertaking the right technology tool methodology to pick up that pest. If we're looking for the actual bee that's floating out in the field, we'll put out those catch boxes, the ones that Danny mentioned and he's talk about remote catch boxes. We'll put those out in the hope to capture the bee. We'll send out teams with floral sweep nets to try to sweep net up any foraging bees.

So there's a tool or a method out there that we've deployed in the hope to detect a particular pest. I will say there's probably one new method that's really cool, I really like it, that's been included in the program this time and it's on the back of learnings from the Varroa jacobsoni response in Townsville a couple of years ago where they used birds and regurgitated pellets from birds to look at the wings that are in the pellets to see if there's Asian honey bees in the area. So that's a really cool technique that we've learnt from a response and we've implemented into the program to look for a particular bee. So there's a lot that we can do.

Richard Keane: It is. You could probably take up all the time talking through it, but it's definitely a challenge. Just panning back to Gunter now, if that's okay. On what type of goods do you typically find bees?

Gunter Ebert: There's no real typical answer to that, but I can get this awesome stats that we've had for this year that I get somebody to prepare quickly. So 89% of our detection so far this year have been on containerized and non-containerized goods in air and sea cargo and on break-bulk such as vehicles and machinery and bulk products, et cetera. The other 11% has been in personal imports, travellers baggage, personal effects on cruise ship and even in the mail. But generally, air and sea cargo, particularly contained as there a hitchhiker pest they can be on anything, particularly something that's got easy access where they can try to establish a home.

Richard Keane: Thanks Gunter. This one's for Tara. Could bee semen introduce Varroa mites?

Tara Needham: So thankfully, bee semen is not to be vulgar but is just the liquid portion. So there is no bee associated with it when it comes into the country. And Varroa mite needs a bee host in order to travel. It can only survive for five days off a bee. So thankfully Varroa mite is not one of the biosecurity concerns when importing semen.

Richard Keane: Throwing back to Danny. Danny, I'm a PhD student at Griffith Uni working on pollination behaviour of bees. I've moved from India this year and want to have a hands-on experience on Australian beehives. Is there any opportunity provided to the researchers as well to learn how to inspect beehives, detect different pests and diseases?

Danny Le Feuvre: So probably not specifically targeted to researchers, but what I would recommend is in the Australian honey bee industry, we are really lucky to have a really big network of bee clubs, bee associations, state associations and national bee body. So in their local area, there will undoubtedly be some bee clubs that are always very hands on, very practical sort of groups. So even without a beehive, you can join those bee clubs, get involved, go to their field days, get out there, have a look, and they're always focused on biosecurity because it is so important to our industry. And so you'll undoubtedly learn how to do those surveillance techniques through those bee clubs.

Richard Keane: Thanks, Danny. And I think we did mention it before, but we'll provide some web links and information for everyone afterwards if we don't get to all of the questions or in case you're interested and want to research it more. This next one is for Joanne, and I knew this one was coming Joanne, but can you please tell us a bit more about the possibilities of the eradication of Varroa destructor?

Joanne Cuming: We are very close now to completing the euthanasia in the red zones and following that program we then roll out the management of wild honey bees across those zones. So as the euthanasias completed in each area, we start the wild honey bee program rolling out. And then following that, we were looking at monitoring using sentinel hives in the eradication zones for a period of three years. And then, yeah, so we have the surveillance efforts across then the purple zones as well. They have confirmed that detection has been contained. What I'd just add to that though, the response that we have activated or mounted in Australia for Varroa is significantly greater than any response that has been carried out in other parts of the world where Varroa has been detected. So in our ability to have been able to delimit the outbreak into the red zones, yeah, definitely does give us great confidence in being able to confirm eradication.

Richard Keane: Thanks, Joanne. And a big shout out to everyone involved in that response. I know it's a massive effort, so thank you. Dr. Shanks, how does remote surveillance of catch boxes and sentinel hives work? What can be detected and is monitoring at port, state, national level? Thanks to all speakers as well for very interesting talks by the way. Over to you.

Dr Jenny Shanks: Yeah, no thanks for that. So remote catch boxes, what Danny highlighted before, are included in the surveillance program. So they are a empty box that is of a certain dimension that has the insides of a normal hive but without the bees. So it's just an empty box sitting out there in a strategic location that we know that the port of entry that it's located in could have hitchhiker swarms like Gunter mentioned coming in. So they'll sit there. The remote ones also have solar panels to charge a phone that connects to a website that sends alerts to apiary offices, our jurisdictional teams in the event that there might have been something detected in there. So it's kind of sending out alerts frequently if there's something in there. So it's always scanning, having a look, letting us know.

It turns our response time from every six weeks, we might go check those catch boxes manually to being told 24/7 that whether there's something in there or not. So it makes our detection early response activity fastly quicker. Remote surveillance is something that's not necessarily new in the space. There's a lot of remote technologies being developed for other programs. There's a lot of work happening for sentinel hives. So Danny, there was comments about the Purple Hive. There's a whole raft of other teams out there, hive keeper, that are developing similar technologies. The thing with technologies that we have to ensure that they can work in remote locations. So when we may not have internet connections satellite, we got to make sure that they can be charged. So solar panels, et cetera. So there's a lot of work that goes into smart technologies. They really do have a place to play into the future. They are a cool unique technique.

In terms of surveillance that happens, so the national surveillance program is at our highest risk ports and locations around ports. And that is a national program that works with our state and territory governments. We also work closely with our commonwealth teams. So at the border surveillance teams that were mentioned regarding any detections of swarms at ports in cargo, et cetera. I know there's a lot of connection with state and territory governments with the commonwealth teams in working across that jurisdictional border area. So there's a lot out there that are working together for bee biosecurity. And I'll also just add in our state governments, we also have bee biosecurity officers that are funded by the Australian honey bee industry and they are there to help beekeepers inspect their hives. So we've got pre-border, at the border, post border surveillance, and we have teams out there within our state governments working directly with the beekeepers to inspect their hives there. So there's a lot of work happening across the system, across the network across Australia.

Richard Keane: Thanks very much. And that's a good point. It is a collaboration amongst industry, the community, state and federal. Everyone's involved together as part of that national biosecurity system and protecting Australia. Now this next question is for all panellists. So I'll give whoever wants to answer it jump in first. But the question is, do the current biosecurity measures allow any exceptions to not destroy identified Varroa mite infected hives say for field research purposes?

Danny Le Feuvre: That is a tricky one. I'm looking at the other panellists and I'll have a crack at first perhaps. But the short answer is no, we don't want for Varroa mite in the country. It's such a hard pest to deal with. It's such a small parasitic mite that unless it's in a quarantine approved facility, which there are some of those around the country, we don't want it just floating around in beehives. And that's why we are putting such a big effort into this eradication program. We are creating such heartache from so many beekeepers in the red zone that if we were just to allow other beekeepers just for research purposes to have Varroa mite in there, it just totally undermines everything we do. So unless it's a properly designed and tight protocol controlled quarantine facility, we really don't want mites out at any other hive.

Richard Keane: Anyone else on the panel want to answer that or stick with Danny on the protocols? Yep. Getting general agreement there. Noting the time, I'll move on. Thank you, Danny, for that. Tara, this is a good one for you. How long do imported bees need to remain in quarantine on arrival in Australia? And do you test for any viruses or have a minimum period for symptoms to develop?

Tara Needham: I probably can't go into too much detail in that aspect because that's handled by the staff at the post country quarantine facility. But the big thing certainly here is that queens that come into Australia for import purposes actually never leave quarantine. So they're artificially grafted into foster colonies within the quarantine station. It's all enclosed. It's quite a unique and very special setup. And so her offspring are grafted and it's her offspring that are then tested and then passed out of the quarantine station. But she remains and once she has essentially lived out her life, then she stays. And then that enables us to have a very great deal of control as to what is coming in and what is leaving, because essentially what comes in never leaves that little space.

Richard Keane: Gunter, just throwing back to you, are you able to tell us how many detections of bees in transit there are each year?

Gunter Ebert: In transit, I'm assuming you mean on imported cargo or on imports. I can't speak for the previous years. For this year to date, we've had exactly 100 detections. Of those, 24% of them were alive, 6% of detections were alive and dead, and 70% of those detections were dead. I hope that answers the question.

Richard Keane: Just going to throw this last question out to all of our panellists. Does anyone know if there's an international forum that provides other countries ways of dealing with Varroa mite to establish best practice models for eradication of Varroa destructor?

Dr Jenny Shanks: I can jump in quickly and I'm sure everyone else has some other responses. So Australia works with what used to be called the OIE, which is now called the World Animal Health Organisation. And it is a international system where all countries come together for animal based pest disease management. It's got protocols on there. There's reporting internationally about individual countries status for presence or absence of various animal diseases. Internationally, honey bees do fall underneath animals, not underneath the plant system, just because they're seen as livestock.

Australia has got a connection on the World Animal Health Organisation. We work quite closely with our Pacific partners as well because Varroa is, for instance, it's right next door, it's over in New Zealand. It's surrounding us. So we work closely with our partners there to share information about what we do in terms of our active surveillance, but also learning about management over there so we can get a bit of a preparedness step forward on what's happening. And we also learn from any research, new methodologies, techniques that are happening overseas that we could implement here. That's some of the information I have there. If anyone has anything else to add?

Richard Keane: No. I was going to give you seven seconds of silence, but I think everyone's in vicious agreement there. Look, thanks to everyone for joining us today, but on the screen we'll also have other channels to connect to our work and details of how you can be added to the invitation list. If you like this webinar and want to be involved in any others, we would certainly appreciate you passing on the good work from the team that we have here in DAFF, as well as the behind the scenes. So there'll be a bit of information there as well. I'll just like to thank everyone who's been here and been able to present today, but also to the biosecurity education team at DAFF, as well as the behind the scenes contentgroup for their assistance. And if we don't get to any of these other questions, there'll be a lot of information there to help you all find out some further information about bee biosecurity. But on behalf of everyone here, thank you very much for joining us all today and hope you have a good afternoon. Thank you.

[Webinar ends]

**Acknowledgement of Country**

We acknowledge the Traditional Custodians of Australia and their continuing connection to land and sea, waters, environment and community. We pay our respects to the Traditional Custodians of the lands we live and work on, their culture, and their Elders past and present.

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