

10 AGENTS OVER 10 MONTHS

#5 Pests

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SPEAKERS

Jessie Gray (She/Her), Rehan Scharenguivel (they/them), Amber Xavier Rowe, Elizabeth Thompson, Tegan Anthes

Tegan Anthes 00:04

Good morning. Good afternoon. And good evening, everyone. Welcome to the Agents of Change 10 Agents over 10 months Online Series. Thank you for joining us for the fifth webinar in the series. I can't believe we're halfway. I hope you've enjoyed the others from the series either live or on the AICCM website.

Before we begin, I would like to pay my respects to the traditional custodians of country throughout Australia, and their connections to land, sea and community. I would like to pay my respect to the elders past and present and to extend that respect to all Aboriginal and Torres Strait Islander peoples today.

For those of you that have missed the previous parts of the series, and don't know me, I am Tegan Anthes, the current convener of the AICCM Preventive Conservation Special Interest Group. I have co organized this series with Elizabeth Thompson from QAGOMA, and a dedicated committee of volunteers. This committee has worked hard to engage, connect and include speakers and themes that will enlighten, challenge and broaden your knowledge on the Agents of Deterioration.

Tonight we are discussing pests, integrated pest management, pest treatments and pest monitoring. I know many in regional Australia are currently suffering with the horrific mouse plague, and I hope your pest management programs are preventing them from getting into your collections. Let us know via the chat box if you live in an area with the mouse plague or any other plague that's infesting your collection town or state. We have over 200 registrations from across the country and internationally. So there may be other pests out there. And we would love to know what's eating your collections.

For your information, the chat box down the bottom is for comments and greetings. And the q&a is for specific questions for the speakers. And if you are interested in a specific question, then you can use the up vote button, which is the thumbs up symbol. And that will push that question up to the top of the list for the moderator to engage with the speakers at the end of the session.

Tonight sessions we have presentations from Australia and the UK on pest management treatment and monitoring. To begin we have Elizabeth Thompson, the co-convenor of this online forum and preventive conservator of QAGOMA, she's presenting the results and findings from our online pest survey on integrated pest management.

Following Elizabeth, we have a joint presentation from Rehan Scharenguivel and Jessie Gray. Rehan is the Collection Care Conservator at the Australian Museum, coordinating the museum's IPM and environmental systems as well as other preventive programs. They have a keen interest in data analytics of pest information and exploring treatment options for cultural and scientific materials.

Jessie Gray is the preventive conservator at the Museum of Applied Arts and Sciences. Jessie specializes in preventive conservation, and manages the museum's IPM and environmental monitoring programs. She is interested in IPM data analytics and sustainability in the museum sector.

Following those two, we have Amber Xavier-Rowe, who is presenting from the UK this morning. Amber has been working with English Heritage Trust since 1994, as Head of Collections Conservation since 1999. She is an expert in preventive conservation for Heritage collections, and with extensive experience in insect pest management.

The q&a session tonight will be moderated by Elizabeth. So she's got two roles tonight, presenting the survey and then following up with the moderation. So once again, I welcome you to the Agents of Change 10 Agents over 10 months. I hope you enjoy tonight's forum. And I will now hand over to Elizabeth.

Elizabeth Thompson 05:08

Hi, everyone. I'm just going to share my screen. First of all, thank you to all those who took the time to complete the survey. I know how busy everyone is so we really appreciate it. The Agents of Change committee along with the help of Rehan and of course the AICCM put together just a basic pest survey of 15 questions to find out what people were up to in the world of IPM. I'm only going to give a brief snapshot of the answers tonight as Tegan, I will write up a more comprehensive response for the AICCM newsletter later this year.

Although we only received 44 responses, you can see from the pie chart that there was quite a wide breadth of answers from different organizations from federal funded institutions all the way to small volunteer run institutions. And overall the results were quite heartening. It was very encouraging. to see for example, as you can see on the other pie chart, that 80% of respondents had an IPM program, and I'm guessing that the remaining 20% didn't due to lack of resources and funding more than lack of want.

When it came to the types of insects found, it was not surprising in Australia at least, that there was a wide breadth of pests - spiders, cockroaches, rodents, lizards, birds, possums. But the four pests that pose the most risk to collections, were case bearing moths, Carpet beetles, wood boring beetles, and webbing clothes moths. So in light of this statistic, it will be most interesting to hear what Amber has to say regarding moths later in her presentation. I think that this statistic would change quite drastically depending on what part of the world you were from, and I'm not sure exactly if the respondents were all

Australian or if they were international, we need to look into that further. But one thing I was surprised about, with the greatest risk stats, was that only 10% of people said that drugstore beetles were an issue as we've had quite a problem with them here in Brisbane.

Not surprisingly, blunder traps are used by 97% of respondents and monitoring was carried out monthly by nearly 60%. And I think these answers are again positive because they demonstrate quite active IPM programs, again a positive statistic.

When it came to the types of treatments used to prevent or treat pest infestations, freezing came out on top at 76%. Which is another positive stat because I'm sure this is quite a change from 20 or so years ago when chemicals and pesticides would have been far more prevalent. What did surprise Tegan and I though, was the 70% physical removal. What's actually being removed? Are they dead carcasses? Are they trapped live pests? If anyone's got any explanations, please put them in the chat.

Anoxic treatments are a great option but thought to be expensive and tricky. I know myself that it's difficult to get high barrier film in Australia. Though, if anyone is interested, I have found an Australian contact who could manufacture a large quantity of high barrier film so that we could split among several buyers. So again, if you're interested please put that in the chat.

Six of the 44 respondents use heat as a preventive treatment, which is a myth that I'm not terribly familiar with. So I'm really looking forward to hearing from Jesse and Rehan later this evening. The eighth question of the survey asked whether organizations used fumigation or chemical control measures and what types were most often used. And not surprisingly, some form of pyrethrum, either natural or synthetic, was most common with a third of people using this treatment, most often employing external contractors to spray their areas. Now, I'm not sure if this reflects a lot of trust in the contractors or if this is an effective treatment or if it's just an acceptance of a common practice.

We also asked what measures people had stopped using and chemical measures were the comment that most people made. And while chemical measures aren't the most common method, they are still heavily used by the sector. But there were a lot of comments in the survey that said that this method was done under the direction of Australian Biosecurity. So otherwise wouldn't have been carried out - we thought that this was quite an interesting fact. Another method that people had stopped using was the webbing clothes moths lure as they found that the cost outweighed the benefit. I might throw this question to Amber later tonight to see if she has any insights.

One comment made in this question was a very good summary, I thought, of why people had stopped or reduced using chemical treatments. They said that they'd stopped fumigation because of environmental reasons, they'd stopped gamma radiation due to object risk and they'd stopped naphthalene due to health risks. And I'm sure many of you would agree with this statement.

I believe that an important part of IPM is the spread of information and more than half of our respondents reported back to their organizations. But a third didn't at all, and there wasn't very much external communication. So this was interesting, because a lot of people also commented that casual and informal conversations, and that type of communication was often where they found their most crucial information.

Now, of course, we snuck in a COVID question as we were concerned that COVID might have interrupted a lot of the IPM programs and this did seem to be the case. But people seemed really just to press pause, and then once they got access back to their buildings, they were straight back into their programs. Tegan and I will delve more into this and also the minutiae of the survey in our paper later this year. So that's all for me. So thank you so much for listening. I hope I didn't bore you with too many statistics. But now we'll move on to the stars of the show tonight and begin Rehan's presentation. Thank you.

Tegan Anthes 11:55

Thanks, Elizabeth. So now I'll just share Rehan's presentation.

Rehan Scharenguivel (they/them) 12:03

Hi everyone, so I'd like to begin by acknowledging the traditional owners on which I work, the Gadigal people of the Eora Nation, acknowledging their continuing connection to land and waterways in which the museum stands and pay my respects to elder's past, present and emerging. I'd like to extend this acknowledgement to the Dharug and Dharawal people whose lands this work was carried out on. As conservators, we need to acknowledge that our understanding of the environment and its systems whenever compared to the deep ancestral knowledge of First Nations people, and we should always put their experience before ours.

In today's talk, I'll be talking about controlled relative humidity heat treatments. It's an effective and safe way to treat a lot of museum collection material, by heating the object up, it eliminates pests at all stages of their lifecycle including eggs, larvae and adults. By controlling the relative humidity, it reduces the risk to the collection item as well. This heat treatment was done recently at the Australian Museum for one of our acquisitions for an exhibition. It was done effectively and we saw good results.

I wanted to talk about some of the things that we did. And one of the things we did was we used a commercial operator in Sydney that predominantly treats incoming material for AQIS. And this collaboration led to us forming a relationship with them that was really important for the success of the treatment. In how we strove for them to meet museum standards, but also relied on their deep knowledge of heat treatments and the whole process and how it was a two way relationship for us to kind of build on each other. And I think that's really important moving forward and finding those relationships where we can rely on different people's knowledge and also share the museum's knowledge with other people.

So controlled relative humidity heat treatments involve two elements - the heating of the object, reaching its core above 50 degrees Celsius, which is when insects start to be killed. And at around 55 degrees Celsius, you see permanent damage to the protein and lipids and DNA, which ensures that they are all limited across all three life stages. It is an effective and safe non toxic method to killing insects. And by keeping the relative humidity stable through moisture content added during the treatment, you're able to see minimal distortion with the object. So the National Trust was able to test this through acoustic monitoring and saw less movement in the objects than during their day to day operations it would see in their historic houses. It is an effective way ensuring minimal harm to the objects.

So heat treatments can be done inside and outside of chambers. But the advantage of using a chamber is controlling the relative humidity to quite a small percentage. So we use it in a chamber because our object we knew was acquisition material, we wanted to keep those conditions quite tight. Also within the chamber, we're able to control the incline and decline of the conditions of the chamber so really able to set those parameters based on what the object needs, and what we think that object can handle. So it has a lot of advantages in that way.

And heat treatments have a relatively short temperature and treatment time. So the advantage of this is, especially with our treatment, that it had a short turnaround, we had an exhibition scheduled to meet, as everyone knows and we needed that short time to really activate that treatment and get it done so it could be installed.

Obviously, it has significant disadvantages depending on the object. Definitely not all object types are suitable for this treatment. And really having a strong understanding of what the object is made from and how it was made is crucial. And especially with TGS, and other materials that can melt at the temperatures required or deform, you really have to understand that before undertaking a heat treatment like or pest treatments, whether it's low temperature or anoxic, you do have to, I guess, have that understanding of what is going to happen to it.

So before undertaking this treatment, I had been in discussions with a variety of institutes across the world on how they were using heat treatments. So we're discussing with Adrian Doyle from the BM, as well as reading papers by Tom Strang, from the Canadian Conservation Institute, as well as a commercial operator across Europe called Thermo Lignum, who also run facilities in Southeast Asia at Sarawak Museum, and understanding of their treatment times length and problems that are occurring, So just developing that understanding. But there's definitely a framework for using these kinds of treatments, especially around natural history objects, as well as solid wood objects and furniture. And what we're seeing from other institutes is that they're able to complete these treatments quite successfully with minimal damage or risk to collection items.

So the background of the treatment from the Australia Museum's controlled relative humidity heat treatment, it was a cultural artifact that was coming in for an exhibition, we are quite a short turnaround from when the acquisition was coming in to when it had to be on display, which ruled out anoxia, which would have been probably more of a standard option that we would have gone with in the past. But also low temperature was ruled out due to cultural sensitivities around handling the object. So we're really left between a rock and a hard place with this one, which is why we started investigating heat treatments, as well as other things. But heat treatment came out as the number one priority of what we could do. Another thing was that it had an active wood borer infestation when it arrived at the museum that we were unaware of before it arrived. But we needed to have this treatment done before it entered any collection spaces. Otherwise there was a high risk to other collection items on display and within our stores.

So I had already done some prior research around heat treatments available in Sydney. And background understanding of what kind of environment we're working in, in Sydney, in case something

like this did happen - so had that groundwork already going, which definitely saved us a lot of time. But the contractor that runs the chamber in Sydney is Ecotreat and there's other chambers around the country. It's approved AQIS importing methodology AQIS's treatment prescription is a lot more harsher than what would be advisable for collection material. And certainly people could argue that what we were treating was appropriate. So if someone ever wants to go down a path of having that discussion with AQIS, if you have any incoming material, I'm sure they have been lenient in the past for some things depending on the methodology, so it could be appropriate if AQIS is prescribing a treatment.

But Ecotreat had a background somewhat in museums in that they'd written it in their business case, but they never treated museum objects before. Their main kind of resources were grain material, so they were doing quite different treatments to what we'd do for museum objects. But they had a background and some understanding of what we needed to do. So the first step for us was coming to a mutual understanding of the conditions of the treatment, and what they could acquire in an appropriate timeframe. We had to try and negotiate as gently as possible, obviously, heating an object to the temperatures required could take some time. But also, having the chamber operating for a longer period of time would have cost us more money and may not have been appropriate with that scheduling. So we came to an understanding that allowed us to fit in a schedule, a heat treatment schedule, within the timeframes we needed, as far as what worked for them. And definitely having those discussions around security, cultural sensitivities, with non museum staff is always kind of a challenge. But we really took the time and Ecotreat were really fantastic in acknowledging that museums kind of operate in their own little bubble. And they wanted to really join in and champion that bubble, which was great. Also, we were able to gain so much knowledge from them around heat treatments, as well as how to deal with AQIS for other projects we had coming up in the future, which was great.

So after our discussions with our contractor, about what would be appropriate treatment for the object, as well as consulting the literature, especially from Strang, we have to come up with the treatment methodology of hitting the core temperature, which is a separate piece of wood with a temperature probe in it of comparable size and object to 50 to 55 degrees Celsius for a minimum of three hours, with the change of Rh of less than 10%. To achieve that, we had to get an external air temperature of 70 degrees Celsius, which was probably a bit scary to begin with. But upon investigating the object and what materials it was, it was decided that no kind of TG or lacquers that applied would be affected by that temperature. So just doing our research on material type was really important beforehand. And Robert Clendon, who was the cultural conservator at the time, really did a lot of research and condition checking the object, which was really helpful to work with him on how the object was made, as well as the materiality of it.

And the treatment can be broken into three stages, there was the increase period of raising the core temperature to the appropriate temperature and holding that period for the three hours required. That lasted 19 hours. And then after that, we allowed the chamber to slowly naturally return to ambient, so ceased heating, and started having external air come in at a slow rate to kind of slowly start chopping it down. And that lasted 24 hours. And once it had reached a temperature we felt comfortable with, we allowed the contractor to open the door of the chamber. We just increased that airflow between internal

and external, and that was held for 24 hours just to gently decrease the temperature for the object and return everything back to normal.

So I'll show you the graph on the next slide. So this is the graph supplied by Ecotreat, which is a summary of our treatment of our objects. So four different readings. The first one I talked about is the relative humidity, kind of a bit of variance. But the first step is just the chamber to begin. Our object came from our stores and was transported in environmentally controlled tracks. So actually, the object's relative humidity wasn't changing that much because the treatment started at 4:30am and in half an hour, was back up to where we needed it, and so wouldn't have seen much deformation from that. And that was held at 60. You see the initial drop, which is just the chamber finishing its kill period, I guess you could say, and then you start having a backup to where we liked it around 55. And then the drop is what, this drop here, is when we crack the door open a little bit and then it's just the system coping with keeping that relative humidity at museum standards throughout a whole period of a day. So just like a standard aircon.

Next I'm talking about the core temperature, which is the core piece of wood with the temperature probe, so that's what we use to measure and make sure that the treatment was being successful in killing insects at all its life cycles. So you have it above 50 degrees, you have it at about just under 55 or 55 for the kill period. So successful treatment. And our bio assays within the chamber also confirmed that we killed the adults at least and we were pretty confident that we killed all life cycles of the insects and then you start seeing that slow period. So it's pretty much each period is almost 24 hours and after that the slow, gentle kind of returning back to normal.

And then the orange and the blue lines are just 2 air temperature probes so placed next to the object to kind of monitor what was happening outside of the object, see you have both the inside and the outside of the object there on the one graph.

So just some quick reflections and the summary. The heat treatment using existing contractors definitely saved us time. And we were able to plug in to existing local knowledge, but required us to build that strong collaboration approach with a Ecotreat and kind of come to an understanding of what they were capable of doing. And what we required as museum professionals, and what kind of variances that we knew that object could handle.

Definitely, heat treatments aren't suitable for all materials. It just requires us to have that deep understanding and materiality of the object, as well as any collaboration of the artists, traditional owners to understand what they are comfortable with, as well. But definitely for us, we're able to complete a treatment successfully, we were very confident that the treatment eliminated the insects at all its life cycles, as well as through visual analysis, were able to determine that there was no change in the object's condition, and relied on academic knowledge within this field. That probably led us to know that the object wouldn't have moved or deformed in any way during the treatment through the controlled relative humidity.

So finally, I'd like to acknowledge and thank the other staff at the Australian Museum for their contribution to this project, our First Nation's staff, who were incredible in advising us on all cultural

concerns for the object. And my fellow conservator, Robert Clendon, for all their hard work in condition checking the object, and assisting me with the treatment. It definitely took a whole team to get this treatment completed. But without every single one of them, it wouldn't have been as successful as it was. And if anyone has any more questions about the treatment or what our conditions were, feel free to reach out with me, happy to always answer any questions. Thank you so much for listening.

Tegan Anthes 27:22

So that was Rehan's pre recorded video, and I will now share Jesse's video. I'm not sure if you're aware, but Sydney is currently in a very tight lockdown and Jessie and Rehan work in separate institutions. So originally, they were going to present together, but because we're all in lockdown, we've all been separated, so they pre recorded their videos and have supplied them separately. So I will now share Jessie's and we can watch hers.

Jessie Gray (She/Her) 27:53

I would like to pay my respects to Elders past and present, and extend that respect to all Aboriginal and Torres Strait Islander peoples. This work was completed through knowledge sharing with Wukun Wanambi, who is the creator of the artworks we treated, and I would like to thank him for the information he shared with myself and the wider museum team. Without the contribution of First Nations people, this project would not have been successful. For those who haven't met me, I'm Jessie. I'm the Preventive Conservator at the Museum of Applied Arts and Sciences, which is also known as the Powerhouse Museum.

I'll start by thanking Rehan for taking us through the research they've done and introducing the topic. I'm going to be talking about collaboration for successful IPM programs. This will look at the case study of the heat treatment that the Powerhouse undertook with Ecotreat, and will focus on the ways that knowledge sharing with a variety of networks assisted in the development of a tailored treatment plan that was based on the work undertaken by Rehan for their controlled Rh Heat treatments.

Maintaining an effective and innovative IPM program is reliant on consistent learning and engagement with an interdisciplinary field. Every IPM practitioner has different experiences and perspectives which add value to our programs. But often these experiences are not published and we rely on informal networks to distribute the information. This approach is integral to our IPM program, and knowledge sharing with a variety of networks underpinned the process of researching and planning the treatment methodology. These networks for the Warrang Sydney IPM group, the PestList email forum, and of course, direct collaboration with Rehan and the Australian Museum.

The context for the treatment was a large upcoming exhibition for which the museum was acquiring 12 Larrakitj memorial poles created by artist Wukun Wanambi. The poles are made from hollowed Darwin stringybark logs and the 12 Larrakitj show the different stages of their creation. From the removal of the bark to being painted with white ochre and overpainted with Wanambi's fish designs. Six of the larrakitj that we acquired are painted with ochre and sealed with an acrylic fixative.

As part of our preventive program, we require that all incoming objects are inspected for pest evidence and vulnerable material such as wood paper and textiles, they're treated preventively to ensure that we are not bringing pests into our collection spaces. Our preference is for anoxic treatment as it poses the

least risk of damage to the object. However, we were unable to use a nitrogen chamber. And with the disruptions to the manufacturing and shipping industries caused by the COVID 19 pandemic, we have struggled to find suppliers of conservation grade materials for anoxic treatments. Our other onsite treatment option was freezing. But as the objects featured a painted surface over a wooden substrate, we were particularly concerned that freezing could cause dimensional changes in the object, which might result in splitting of the wood or cracking and loss to the painted surface. Additionally, I was unsure about the response that the acrylic fixative would have to freezing.

As a result of these issues, I posted to the Warrang/Sydney IPM group, which is an online forum for IPM practitioners in the Sydney region. And I asked about local suppliers for anoxic treatment materials and advice on treatment options. I was told that similar materials had been frozen before, but as expected there was a significant risk of damage through structural warping and paint loss. The group was able to provide suggestions for anoxic material suppliers. However, when I contacted the suppliers, they were themselves waiting on international shipments of material and had already allocated most of the stock they were waiting on. We had explored the option of getting the anoxic treatment performed externally. However, there was subsequent disruptions to the delivery process in getting the artworks to Sydney. And as a result, by the time they arrived, the lead time for pest treatment was shortened to approximately two weeks, which didn't leave enough time for anoxic treatment process.

Following the discussion with the Warrang/Sydney IPM group, Rehan contacted me to discuss the heat treatment they had undertaken, as they thought it might be suitable for our objects. They provided the details of the company they had employed and the methodology they used, which was particularly significant because while heat treatments are widely used throughout Europe, I wasn't able to find many resources that set out a treatment methodology. Specifically regarding details on what the humidity parameters should be, how slow the warm up time to achieve core temperature should be, how long the object needs to remain at temperature, and how gradual the cooldown process should be. So the information that Rehan shared was integral as it provided us with a methodology, a contractor and a facility that we knew had experience in treating museum objects, and also a case study treatment that showed this methodology and contractor had been effective and had not caused damage to the object.

As I began to consider heat treatment as an option, a few concerns emerged that became a priority to resolve before proceeding. The impact of humidity fluctuations was the primary issue. I discussed this concern with Rehan and they were able to show me the graph they were given by the company, which tracked the environmental conditions during the treatment. I could see from this graph, that while the humidity did undergo changes, the methodology that Rehan had implemented, created a gradual change rather than a rapid fluctuation. I then contacted the company to discuss options and what they thought would be suitable for our materials and we developed an initial methodology.

Our next concern was regarding the effect of temperature on the larrakitj. While there is research available on the way that wood reacts at elevated temperatures, there is little evidence on how the natural pigments would respond, and we needed to consider the acrylic fixative as well. We're able to get in contact with Wanambi who provided the details of the specific acrylic fixative he used, and so we were able to source and test the material. To do this, I undertook some trials using pieces of wood

painted with ochre pigment, and then coated with different amounts of acrylic fixative. These were then placed into a cold oven and brought up to temperature at 70 degrees, which is the air temperature advised by the company to use during the treatment. They were held at 70 degrees for four hours. Then the oven was turned off and they were left inside overnight to simulate the planned gradual cooldown process. The oven was not humidity controlled. So when the mock objects came out with no damage, it was a good indication that the risk to the paint and acrylic from a heat treatment was low. We also considered the history of the larrakitj in our decision making process. We knew that the material had been in an environment with temperatures reaching to 35 degrees and there's a much lower gap between 35 and 55 degrees than there is between 35 and minus 20. So a heat treatment seemed more appropriate to this material than freezing.

A few other logistical considerations to know were that the company provided a secure facility with 24 hour surveillance, they had a loading dock available for us to use, they provided pallets for use in the chamber and they had equipment available to move the pellets.

The final methodology we developed for heat treatment followed the general structure that the Australian Museum had taken with some slight changes for our material. Our overall treatment time was shorter because the wood was a lot thinner and took less time to come up to temperature and to cool down. We ended up holding the material at a core temperature of 55 degrees for a period of four hours. To ensure that the shorter treatment period would be effective in killing insects I posted to the PestList email forum, which is an international forum for IPM practitioners. This put me in contact with several IPM experts in Europe who use controlled RH heat treatments regularly. I was able to discuss our methodology with them, and they confirmed that they generally use shorter treat times even as short as one hour.

We then optimized our cooling down period using the data that Australian Museum provided, we noticed that the temperature gradient began to level off after six to eight hours. And so we set our initial cooldown period for eight hours. And this is with the Chamber off and the doors closed. The second cooldown period, which is with the Chamber doors opened, was then carried out for 12 hours allowing the objects to acclimatize.

So treatment was successful, and we found no damage at all to the objects and were able to get the treatment complete in a three day period, which included packing and transporting the objects to and from the facility. This then gave our exhibitions team more time to prepare supports.

In the process of undertaking this treatment, I collaborated with local and international networks to develop a suitable methodology for the treatment of the larrakitj. This meant that we were able to protect our collection, and also that the information and experiences which were shared, have been collated in these online forums and now exists as a point of reference that can be accessed again. This reinforces the importance of being involved in IPM networks and communities, particularly in Australia with our variations in climate and seasonal changes, regional disaster events, different access to resources and local animal species. All of these factors will impact pest presence in collections, and the resources and options that are available to manage them. So having local knowledge sharing networks

such as the Warrang/Sydney IPM group is so important to figure out what's happening in your regional area, what other institutes are experiencing and being able to share resources.

The desire to ensure objects safety and understand how materials will react to new treatments can be a barrier to the use of new techniques, materials and methodologies. By collaborating and resource sharing, we provide opportunities for practitioners and institutes to break down these barriers in order to facilitate improved IPM practices as we strive for the best care of our collections. So that's the end of my presentation. And lastly, I'd like to acknowledge Wukun Wanambi as the copyright owner of the larrakitj. And I'd also like to thank Vanessa Pitt and Maddy Riley for the photographs they've provided. So thank you

Tegan Anthes 38:35

Thanks Rehan and Jesse for your presentations. They're super interesting and I can see that there's quite a few questions for you after Amber's presentation. So now I'd like to welcome Amber Xavier-Rowe to share her screen and her presentation. Welcome Amber.

Amber Xavier Rowe 38:59

Good evening, everyone. Hopefully, that's working and you can all see the screen and hear me. Well, it's brilliant to be with you. In this kind of crazy world. The Zoom universe we were in these days, I was really thrilled to be invited to share with you my passion for insect pest management. We've been doing it for quite a few years at English Heritage, coming up to 25 years. Hopefully these images can give you a glimpse of the type of collections that I'm responsible for.

English Heritage is actually an independent charity. We used to be connected to government and funded by government but from 2015. We were released, so to speak, with a lump sum to help us on our way, and we're responsible for the presentation and care of over 400 properties across England. 136 of them have collections and we estimate, over 1 million objects in 10% are on display. The large majority of objects are archeology, and you could say, well, archaeology isn't particularly at risk from insect pests, we do have a sort of side issue about the wooden pallets that the archaeology is stored on. But that's another story. The majority of the collection, the rest of the collection, is made up of social history, decorative arts and fine arts books and archives. And of these, there's a substantial number of organic materials on open display. And you can see the spread of the science collections in this map. So I thought I might start with just reflecting on, you know, what is the risk from insect pests? And, you know, why? Why are we so concerned about them? And, you know, well, if the conditions are right, and you have vulnerable collections, you know, the damage can be catastrophic. This is just a little example. It's a sweet tea cozy, a rooster, which has been damaged by insect pests. I would like to point out this is before it came into the management of English Heritage. And you could, you could say that the majority of the agents or risks that we deal with as preventive conservators, you know, that affect a sort of gradual change over time. And so what is an acceptable, you know, can we manage a gradual change from insect pests to collections, you know, how many holes are acceptable? You know, no holes are acceptable in my jumpers. So, I mean, I'm of the opinion that insect pests as a risk is potentially the greatest risk to heritage and museum collections.

The chart on the right is, is a risk facing English Heritage collections. And we undertake a ten year survey every 10 years, a risk and condition survey, the methodology has been published, you can see

the link below if you're interested. So in 2010, the risk from pests, our risk factors along the bottom of the chart, the risk from pests compared to the other risks is quite low. And then in 2010, it's even, it's even lower. Now, you could say, well, I've just been raving on about how I think the risk from insect pests is, you know, major. Well, this information or this evidence is, it reveals just how effective a long term insect pest management program can be in managing this risk.

So if I take you through this program, then so this, this talk, I'm going to split into two halves, I'm going to just quickly run through briefly the IPM program. And then the second half, I'm going to introduce the power of the insect pest to attract public attention. So our program, of course, as you know, is based on a tracking program. This is one of my collection care assistants in my team, he has recently retired, and Tina, and she's responsible both for doing the conservation cleaning, which is absolutely essential to controlling insect pests, and helping with the trapping program. We you know, we have an ongoing training to support the trapping program, we use the catch data to target action, we very rarely need to use treatment. And we manage, we try to prevent the critters from getting in in the first place.

The program is managed full time by Collections Pest Control Manager. And it's worth pointing out that to establish a long term IPM program you really do need someone who's who's leading on it. This post, I managed to set up in 2003. And it was at the point when my team was sort of less than half the size it is now and I felt that it was incredibly important, I was trying to do it on my own. And it's just impossible to do. So it's made a huge difference having someone working full time and I'm going to introduce you to her, her name's Dee Lauder, and also to Dave Pinniger who's been sort of ongoing advisor to us. So here we go. I mean, she's Dee and Dave.

45:28

Well, you all remember last winter, it's handicaps. Its disappointments. Remember when you lost your shirt, your coat, your smart frock, all were ruined. And now it's happening again. The spring is over. And the seasons here, the biggest part begins, the moths are back and here they come bunched up, neck and neck, wingtip to wingtip. Every one of a moth and every moth of evil design.

45:49

Hello, my name is Dave Pinniger. And I'm an entomologist, which means I study insects. My job is to help people with pests in historic houses and museums

46:00

and I'm Dee Lauder and I'm English Heritage's collections Pest Control Manager. And we're here today to help you learn how to deal with clothes moths.

46:14

Clothes moths are small and silvery gold and you'll see them flying around the house. And they don't do any damage at all. But they lay eggs which hatch into tiny grubs or larvae. And they are the things that cause the damage. Clothes moth larvae will eat a lot of different fabrics, but only those which have materials of animal origin. So we're talking about wool, fur, feathers, and silk. The larvae have jaws at the front which work sideways like bolt cutters, and they will cut through fibers of carpet or your best woolens.

Amber Xavier Rowe 46:50

So that's Dee and Dave. So if I just touch on our trapping program, it covers 70 sites across England. And we divided the sites into three categories. Category A, we check the traps four times a year. Category B, we do it twice a year and Category C we don't actually have traps in place, but we do a visual check once a year. The catch is identified and recorded by the collection care assistants and conservators in my team, and annual IPM Site Reports are circulated or prepared and circulated to all internal stakeholders. And this is all systemized and managed by D. And we use a standard insect monitoring sheet which is available for people to use. If they desire it from the website, you can see the link below.

We focus very much on making sure that we get the ID correct because as we're all familiar some of these things, insects are very similar. And so we've been publishing an insect pest poster since 1998. And this is the recent addition. Here it is in the flesh so to speak. It's available, again free from the English Heritage, again, the right way around. available free from the English Heritage website. And you can download it as well. I'd also like to highlight this, this website, What's Eating your Collections, and we use this site because it has much more detail in terms of different sorts of insects and help you make the all important ID. And also just to highlight that from our website, there's a whole range of fact sheets, papers, you can get the poster in French, if you like.

So in terms of the second sort of part of our IPM program is all about training and support. And that's led by our collections Pest Control Manager, and she does a lot of one to one coaching. And she puts us all on refresher courses. To make sure that we're up to date with the latest insect pests. You know, the gray Silverfish is a new kid on the block, for example. And generally about keeping us up to date about developments in IPM. And we were a founding member of the Pest Odyssey group. And I think there's a conference coming up in September, which has just been announced. So the focus of our training support is also on working with the site teams, the conservators and the collection care assistance in getting them to clean their sites. And because as we all know, thorough cleaning is the first way to deal with insect pests risk.

We use the data actively from our catch results to identify where they're coming from and to target our actions. Conservation cleaning is the number one thing. It helps us to deal with issues like cluster flies, sweeping chimneys, helps us to identify leaks, walk down pipes drains, birds nesting, dead animals. The example here is from Walmer castle. You can see the trap locations in red and trap number 12. We were catching a lot of case-bearing clothes moth. And that was located in the fireplace, when we cleaned the chimney and a lot of, well six bags, rubbish, rubbish bags full of stuff came down the chimney, bird's nests, a bit of dead birds. And this highlighted to us the risks from chimneys, particularly in historic houses where we no longer use them. So they are no longer swept and the trapping program helps us to identify which chimneys need to be swept.

So when we do need to do treatment, we use insecticide with a low percentage, permethrin permethrin 0.2%. insecticide, it's water based, it's called Constrain. It's available in the UK. And we have used freezing and we use heating and I'm a real advocate of heating. And we can probably talk about that after the presentation. But we have had no damage from any of our heat treatments. And we've heated a whole range of materials from fine art through to ethnographic materials as well. And in the past, we

have done large scale freezing treatments, where we've taken on a property with a significant insect pest problem and all of this treatment is combined with our conservation cleaning.

And then the final element of the IPM program is preventive action. This is about you know the first thing is, in our situation, is to avoid introducing wool, any form of wool, into the space so to speak so woolen curtains, carpets, underlay and wall insulation. And we are increasingly using synthetics. And the packaging is becoming an issue too with bringing in the gray silverfish. We need to check every, all the props and exhibition materials, sets for film shoots and costumes and so forth. Again, combined with our cleaning. And then when we're building new, doing building projects, need to avoid gaps and ensure that we avoid creating dead spaces and make sure that any, you know, intakes for air conditioning systems, for example, are properly sealed against insect pests. So this example here is very kind of a dull picture. But it illustrates the point about this is that just recently, about a month ago, we discovered an infestation of case bearing clothes moth in this wall, blue wall felt, which was introduced about five years ago without the awareness of the conservators at the time. So we were in the process now of, we thought we could manage this, the wool felt in this collection, we decided we can't and that we are removing it all and replacing it with polyester.

So let's move on to the power of the insect, insect pest to engage public IPM public engagement. This is a chart of a webbing clothes moth - total numbers caught at our properties from 1997 to 2020. In 2008, we started using more pheromone traps. And you can see from 2015 to 2016, there was this remarkable jump in numbers. And those numbers have been sustained. Although interestingly, in 2020, they're starting to drop. So we used, I mean this is from our perspective, we can be absolutely clear that webbing clothes moth presents the greatest risk to our collections and to historic house collections generally, in the UK. It's the number one bug.

So we use this information to help create a PR campaign public relations campaign called operations closed mouth, designed to encourage the members of the public to help us catch webbing clothes moth and I'm going to hand you over to my media self to introduce what this is all about.

You're getting the public to help you, how's that? Well, we were really keen to know why webbing clothes moth are rising in the UK. And it's not just the UK, their numbers are rising across the world. And we think it's something to do, obviously, with temperature, they like it warmer. And so we're keen to kind of understand what the spread is across England. And so we're going to ask the public to come into our properties and pick up a free trap, take it home, put it out in their home for a couple of months, and then go to the English Heritage website and record what they catch.

So you're crowdsourcing.

We are. we're starting off a research project, and we were fascinated to see what's going to come back.

Who would have thought insect pests can make global world news. Anyway, so we, you know, created an online form for members of the public to complete, to fill in their catch results and other information. We were specifically looking for them to record webbing clothes moth and the pale backed clothes moth, *Monopis crocicapitella*. And I'm really pleased, I can say that let them know. The pale backed clothes moth, the one on the right is is, the new kid on the block. So we're interested to see what was happening in people's homes with this insect pest. So the data came back in September 2017. And we

distributed 4500 traps, and over 200 people participated in return data. And we had a lot of webbing clothes moth, and actually a surprisingly high number of the pale backed clothes moth. And we'll be able to do a sort of heat map of England to give an idea of the spread. And this, the results from the survey are still on our website.

So one interesting insight from this experiment was that we asked members of the public to recall when they spotted damage, and 40% of them came back and said yes, they'd seen damage. And from that we could work out a kind of threshold of when numbers equaled a big issue. So it appears that around seven webbing clothes moth on a trap indicates a fairly safe situation. But if you're moving above seven, and when you get to definitely 31 you are in infestation territory. When I first started this donkey's years ago, you know, we were aiming for zero, webbing clothes moth, we're now learning to live with them. And you know, seven is a really good result. So as part of this campaign, we did a press release, which resulted in the most successful press release that English Heritage has ever done. In terms of pickup by across all media. The newspapers had a lot of fun with it. The reporting was really accurate. And it was interesting and it was fun. And it they managed to spell conservator correctly, which is one of my you know, bugbears. This is from the Daily Mail. I'm just going to read the first couple of paragraphs because I really really loved it

Had English Heritage launched Operation Clothes Moth on April 1, rather than April the six, it might have invited suspicion. Members of the public have been asked to do many things over the years but inviting them to keep tabs on the nation's clothes moths, those unwanted interlopers in our wardrobes is a first. It's hard to imagine the French or the Germans doing something so exquisitely eccentric.

And they had a great deal of fun with puns. As you can see here with this one, this is from The Sunday Telegraph. So all the major broadsheet papers featured this story. It was also featured on radio, and on TV. And because I was stuck in a broadcasting house doing all the radio interviews, it meant that my team had to get behind the cameras, which they did, and it was a brilliant team effort. We made the front page of the BBC News web page. Now apparently that gets 100 million views per week. Interestingly, that drove visits to our conservation web pages. In March before the launch, we were getting around 2000 hits a month. And then after the launch, it spiked to you know over 17,000 And we use Twitter and Facebook to help remind people to enter their results. And then our marketing department built a whole website around the campaign to support it.

And then we came to announcing the results in in April 2018. So a year later. And the decision at this point was from a PR perspective was to go with an exclusive with the Sunday Times, and the pun, you know, they had fun with puns again. And you know, there was associated radio and News TV and website. We decided to use to use this launch of the results. The announcement of the results to also launch our book. Here it is *Pests in Houses Great and Small*, authored by Dee Lauder and David Pinniger. And it was fantastic. We, for a couple of months there the book was being, it was being retailed in bookshops, and it crossed over from being, you know, a specialist book into appealing to the wider general public. And we've just recently reprinted it was sold 1000 copies. So hopefully, that gives you an indication of just how powerful insect pests can be in raising the profile of preventive conservation and conservators. This campaign was a PR driven campaign. So the aim of it was to raise the profile of English Heritage to help drive visitors to our properties to pick up the traps. But also there

was the underlying aim and experiment that we were keen to see whether we could get the public engaged. And the other benefit of it all was really, well it raised the profile of preventive conservation, and conservators, and also internally, it raised the profile of conservators across within within English h Heritage. And so I often say I really encourage everyone who's involved with insect pests to use them to help raise the profile of preventive conservation with the wider public. So thank you very much.

Elizabeth Thompson 1:02:29

Operation clothes moths, We need an Australian version of it, I think. Can I invite Jesse and Rehan to come on view so you can get ready to answer some questions? There are quite a few questions, and I'm not sure if we're actually going to get through all of them. But if those we don't answer, we'll try and get the answers and publish them at a later date. So people have been uploading the questions that they're most interested in. So I think I'll just start from the top, if that suits everyone.

There's a question from Evan Reese. And it's in regards to heat treatment. And it could any of you I'm sure could answer this. Considering that it is common for timbers and metal and metals to be used together and objects. Can the nature of metals to behave as a heat sink, affect the heat treatment, such as creating localized areas of higher heat, or longer dissipation of heat?

Rehan Scharenguivel (they/them) 1:03:37

I can kind of start the discussion. Yeah, for sure. Like, I guess like all temperature based pest treatments, I guess the composition of objects is really dependent on your pathway that you take. We were lucky that we didn't have a metal component to our object. But that would affect it definitely had objects made and kind of looking at all the components is really critical. Being a heat load, that's definitely an important factor.

Elizabeth Thompson 1:04:04

Yeah, I was wondering if it can be used for those composite sort of materials because of all those differences. Yeah, but you're obviously, Amber have you used it on composite materials as well? Yes, composite objects.

Amber Xavier Rowe 1:04:20

Yes, gilded furniture, paintings, ethnographic objects. And we've been fortunate to have a really good commercial system that's available, that's humidity controlled. And Rehan pointed out Nigel Blades work where he literally wired up and listened to the movement of a gilded, high value gilded piece of furniture from Knoll House and the movement during the period of time was less than the movement then in its normal environment. So the risk from relative humidity is is minimal and the risk from temperature I mean, I think we need to weigh this up in terms of the risk from the insect pests themselves. It's so fast and it's so many advantages for less handling. So it's my sort of go to solution for pretty well, every material except obviously wax that might melt. Obviously, obvious height, height, you know, low TG materials.

Elizabeth Thompson 1:05:18

Yeah, right. Oh, that's fascinating. And one of the questions that is in the list is that from Sarah Jane Rennie she was asking, in Australia, is that 50 degrees 55 degrees, enough to kill all stages? Because we have days of that here. So that doesn't kill the insects so...?

Rehan Scharenguivel (they/them) 1:05:43

Well, like if you look at Strang published a full list of kill rates and temperatures, and I suppose like a hot day, like insects have coping mechanisms, like anything so in a sealed container, they can't really escape that temperature. And I think Sarah asked that question about coring density. Um, yeah, we cored our objects, like we had a similar piece of timber, same size with the core temperature probe. So I'm sure the 50 degrees was reaching the center of that. wires that will just borrow into timber, if it's too hot outside their borrowing cooler, like another insects would go a little bit on the ground, and

Elizabeth Thompson 1:06:21

They're escaping those temperatures normally? Yeah,

Amber Xavier Rowe 1:06:24

yeah. So all insects at 51 degrees pretty well is the average from Strangs and from other work is that that's the point, they just cannot cope with that temperature. And the other thing to point out is that, you know, in hot climates, we expect it's getting hotter here. And solar, solar treatment is definitely an option, things wrapped up in plastic in the end, the buffering, you can achieve, you can keep the temperature in your car, that's really so you know, depending on how the material and how robust it is, you know, it's definitely an option for solar. I think we need to come back and think about that as another means Yeah, heat treatment.

Elizabeth Thompson 1:07:03

Yeah, it sounds like it. So would you use that rather than freezing and anoxic treatments?

Amber Xavier Rowe 1:07:10

Absolutely. If you're doing large, large scale heat treatment, we're about to do one in a month, we're fortunate to have the trailer, you know, we don't need to think about all the trying to work with someone to get the conditions we need. We're working with a company with Thermo Lignum. And they have a standard protocol over many years. And we've used that for a range of collections over many years with no issues.

Elizabeth Thompson 1:07:34

Wonderful. I'm sure everyone's loving this information. I'll move on to another question now. And this is from Casey Albert in Sydney. Hi Casey. She's asking about the larrakitj poles. Was there any evidence of live insect activity in them? And or Has anyone else experienced live activity? We've also got some of those poles at GOMA and while there was evidence that there had been insects, it wasn't active. Yes, sorry, that disappeared for a second. So she did find a live Gecko on hers, but not an active pest infestation. Jessie, would you like to answer?

Jessie Gray (She/Her) 1:08:17

So um, we didn't find anything live. And then I guess there were a couple of factors that sort of influenced our decision to treat. One was that so obviously, it's organic material, which is susceptible to infestation, it hadn't come from a museum environment or gallery. And it had just traveled land travel from the northern territories. So there, you know, a couple of additional risks there. We didn't feel that we could inspect the material effectively, because these are sort of 3m long, you know, wooden poles. And so then we sort of just fell back onto our IPM protocol, which is that if we can't 100% declare that this material is pest free, it can't enter our collections. And then, you know, it's always sort of a balancing act. But we just felt that the risk of this treatment was quite minimal compared to the risk of a potential outbreak in the collection.

Elizabeth Thompson 1:09:15

We have the same procedures. Because once you've had an outbreak you just don't want to ever happen again, do you?. Thank you, Jessie. We'll move on. Sarah Jane Rennie has a question. She's actually asked quite a few questions. And she's aiming this one to you, Amber, thank you for your comment regarding wool, and the replacement of those types of materials with synthetics. She's had issues with curators wanting to use wool tablecloths and felt under objects, and also for people who are holding events in the gallery spaces, and they want to bring in things like Persian rugs? And do you ask people who are using their spaces to freeze or treat things when they come in?

Amber Xavier Rowe 1:10:11

Yeah, basically, I mean, the example would be for film shoots. The protocol was that everything needs to be heat treated or all thoroughly checked. And the indication about curators wanting to use wool because that's the original material and so forth. We're getting over that here. It's, we just can't manage what happens when they get established. So polyester materials are definitely an option. Now they are of good enough quality too. But I appreciate that. It's a bit of a discussion.

Elizabeth Thompson 1:10:49

Yes, yeah. Yeah, yeah. We ask, when we have performances and people are bringing in woven plant material. We treat those before they come into our spaces. So that's fair enough I think. Susie Kevonin. is asking whether the PestList, email forum if it's an international or local, and it's international, I use it. I'm sure. Jessie stated before that she did. Yeah. Do you use it to Amber? Yeah, yes, we do. Yeah. Yeah. Yeah, it's I advise everyone to sign up. Fantastic.

This is from an anonymous attendee, I apologize for my ignorance. But I'm keen to understand what is the cultural sensitivity, sensitivity reason for the object that Rehan was involved with? Why it couldn't be treated with low temperatures. Sorry, and the person didn't hear what culture it was from.

Rehan Scharenguivel (they/them) 1:12:00

It was an Australian, and it wasn't specifically I guess, a community response, but an individual cultural response. And it has to do with their particular association with object.

Elizabeth Thompson 1:12:15

So I think you said before it was who can handle it.

Rehan Scharenguivel (they/them) 1:12:20

so, so that issue, so we originally said low temperature and the issue was the artist particularly did not feel that was appropriate for the object. And it was a First Nation community. So it was a spiritual object. You can't really pinpoint a culture and be like, these are their cultural protocols, especially when we're not from that culture, we have to talk to community.

Elizabeth Thompson 1:12:46

Yeah, it's quite individual, isn't it to depending on the object?

Rehan Scharenguivel (they/them) 1:12:51

Yes, there's certainly different meanings behind so we just take their advice, in those kind of discussions with our First Nations team and community are constantly ongoing for our treatments and everything.

Elizabeth Thompson 1:13:01

It's wonderful that you've got that consultation going. Question for Amber, what criteria, I was wondering, this, too, is used to assign sites to your category A, B, and C in your tracking program?

Amber Xavier Rowe 1:13:20

Yeah, well, it's all around the number and type of collections. And whether they're on open display. So in category A it would be, you know, highly dense display of, you know, furnishings, as you saw in some of those photographs. Category B, we have less number on the percentage on display. So it's for a smaller sites where we might only have you know, 50% of the collection is actually vulnerable. And then category C is where we have sites where we might have, there's two reasons we wouldn't be trapping. Partly because we might have bats in residence. So we have a, we can't, we need to make sure that they don't get stuck on the traps. And also, the number is just a small number of items that are at risk. So there's no need for us to be actively trapping.

And your storage areas?

Yeah, the storage areas. It depends on, you know, all our storage areas we do a category A. I mean, we have a lot of archaeology on storage, but we have this issue, as I mentioned about palettes. So they have all moved into Category A and we have sort of about 10 major stores.

Elizabeth Thompson 1:14:41

That's massive. I don't know how you stay on top of it really, like how big is your team?

Amber Xavier Rowe 1:14:49

Our team is 26 so and that's 11 conservators and 11 collection care assistants and three scientists and Dee at the center of it all, managing and keeping it all systemized and we do keep on top of it with that resource.

Elizabeth Thompson 1:15:07

Wonderful. There's another one for you, Amber, thanking you for your presentation. This is from Lisa Addison. Do you use the same parameters for the heat treatment of fine art items compared to furniture? She assumes that oil paintings on canvas were treated. But were acrylic on canvas paintings

also treated and was there any difference noted? also wondering, sorry, it's a long question. also wondering if you know, if any conservation scientists have studied if there are changes in the molecular level to the paint? Some, she feels that there would be some trepidation for heat treatment for paintings and paper with paint.

Amber Xavier Rowe 1:15:54

Well, we don't have any modern artworks in our collection. So I don't I don't need to cross cross that bridge in terms of acrylic paintings, and I you know, acrylic paintings, I think there is a question over those I have not had an experience of, of heat treating polymer, you know, modern polymer films. The question about the molecular level of damage? Not that I'm aware of I, but there is, you know, Strang's work is very, very good. And the, I think we need to move into a debate here. In terms of the risk from the pest themselves, there's two things you need to number one, that is that is the risk, do you have a clear and present danger from insect pests in your collection? And the second thing is, you need to make sure you kill them. So for some for, for items of wood, and so forth, you know, to ensure that you actually are penetrating into the center the deal with wood borers is absolutely essential. And I could argue that anoxic and freezing that, you know, there's a question mark over, you know, if you don't do it correctly, that you actually get efficacy. And there's also the length of time you're doing it for? Yeah, treatments for anything. So I've really got, I mean, you know, the molecular damage. Yes, you know, there probably is slight change. We know that paper, we're looking at, you know, temperature represents, you know, as you increase the temperature that paper lifetime decreases, this is only for a small percentage of its lifetime. So, when you factor all that in, I'm, I'm very comfortable, as are a number of people in in UK in Europe to do it for a broad range of materials. Yeah, yeah,

Elizabeth Thompson 1:17:45

definitely. Well, Jessie, you your experiments, were for acrylic paint were they not?

Jessie Gray (She/Her) 1:17:51

no, so we were using natural, we had an ochre pigment that I used to simulate the ochre on the larrikitj. Yeah. Right. We did have an acrylic fixative on the top. That's right. Yeah, we were able to check the (effects on?) that, which was really good. But then we just ran it through the experiments anyway, just to sort of, yeah, get a good idea. And that, yeah, completely fine.

Rehan Scharenguivel (they/them) 1:18:18

On the molecular level as well, there has been, Adie (Adrian Doyle) did experiments on DNA of entomology collections, and there was no changes. So this could directly apply to like polymers. But that is kind of some investigations into that. Which has always been for scientific collections. If you change the DNA, you're a bit. Yeah, it's a bit of a problem.

Amber Xavier Rowe 1:18:42

sort of interesting, someone pointed out, you know, the difference between I think, might have been just you between 35 degrees to 51 degrees. I mean, our collections are sitting in temperatures now much higher. So that just to pick up a little bit to do with this major risk, you know, can cause catastrophic damage, as I pointed out if you don't get it right.

Rehan Scharenguivel (they/them) 1:19:03

Slight poke for a little bit rather than long poke for a longer time.

Elizabeth Thompson 1:19:09

Yeah, yeah, it makes sense. Now, this is a question from Erica Satori. The museum I have been recently hired by has no formalized, IPM strategy yet. What practical advice can you give to establish an effective IPM strategy in an institution that has a history of infestation problems, but no specific data on the current state of the infestation?

Jessie Gray (She/Her) 1:19:37

If I can just jump in? This is something that we're sort of going through the moment. I think establishing your IPM policy has been you know, it's just foundational because once you have that, and you sort of got that signed off by the different groups, your facilities, you know, all the different teams are involved in that you can just say you it's now in our policy that we have to treat anything incoming, or we have to, you know, do effective monitoring. So I think just as a baseline, that's, you know, for me the most effective thing you can have. And it's something also you can keep returning to and say, Yeah, this is how we deal with this situation. It's been signed off by, you know, the museum as a whole. So this is how we're gonna proceed. And then once you've got that in place, you can sort of start doing all those other aspects of IPM strategy, which is, you know, you start your monitoring, you start your data analysis, all those sort of other aspects.

Elizabeth Thompson 1:20:35

It's important to get agreements between all your departments. That's your kind of starting point, isn't it? I think anyway, like, what about you, Amber?

Amber Xavier Rowe 1:20:46

Yep. Absolutely. Jessie's in terms of having the policy to start with, I, you know, I would highly encourage that, actually, to start the trapping as well, and not to do it, I mean, once a month is quite, and we can't sustain checking the traps once a month, we, you know, we do it four times a year, and it's absolutely adequate to give an indication of the risk. So you might, and I think once you start the trapping and start showing what you're catching, and start telling the stories about which of those insect pests are a risk to the collection, that helps to bring, bring everyone on board, and if you can involve them with that process and discovery? And then gradually incrementally build and make sure that that policy that you know, your that you have, you know, outlined is getting embedded. I just started trapping in the beginning at one property. Yeah. And that's the whole thing. You know, going forward and just start just just just get those traps out. And yeah, start telling the story. Yeah. Good advice. Put the poster up everywhere, by the way, get the stick it up.

Elizabeth Thompson 1:21:58

It's fantastic. Yeah. I didn't realize that you'd updated it. Oh,

Amber Xavier Rowe 1:22:04

yeah. No, definitely.

Elizabeth Thompson 1:22:08

There's a anonymous question, says which materials and objects are treated with heat? But I think we've we've answered that during our discussion, then. Another from Sarah Jane Rennie. Do we have confirmation that heat treatment kills all stages? timeframe?

Rehan Scharenguivel (they/them) 1:22:26

Yes. Yeah. Again, Strang's article outlines that very clearly. That's the Museum Pests website. The reference will be that I think I referenced it as well. I replied to someone else's comment? So Sarah Jane can find that or whoever else is interested.

Elizabeth Thompson 1:22:43

Yeah, I think we'll be doing a lot of reading.

Amber Xavier Rowe 1:22:45

Yeah. On the What's Eating your Collections website that I, I guess many of you are familiar with there is a fantastic list of just about every insect pest management paper out there ever, if you're ever looking. And it's all available there to download. Just meant to point that out. It's really useful.

Elizabeth Thompson 1:23:03

Excellent. I think hopefully, someone will put that up on the chat.

Amber Xavier Rowe 1:23:09

Actually, you might not be able to download it. Um, I think it might just be the reference.

Elizabeth Thompson 1:23:12

Oh, that's, that's a good starting point. Oh, what? Oh, this is from Margaret Birtley. She's asking what we do, or what you do with any organic remains of dead insects. After the completion of the heat treatment.

Rehan Scharenguivel (they/them) 1:23:30

I just collected mine. I have a collection of reference material for future, showing people that kind of thing. We also, being scientific Museum, have a reference collection that's registered. So our collection, it often gets added to the collection as well as I just have examples because I can show people and throw around, it's not like registered material. But a lot of our insects get registered as well.

Amber Xavier Rowe 1:23:56

We just vacuum them up. Yeah. Brush vacuum and they all go up the vacuum cleaner.

Elizabeth Thompson 1:24:08

There's a question from Evan Reese for Amber - given the push to discontinue oil based products have you identified a sustainable synthetic fabric to replace insect vulnerable fabrics?

Amber Xavier Rowe 1:24:27

Well, I'm sort of skirting around that. Yeah. No, I think that's a good point. And something that we'll we'll need to look into. But you know, not at this stage. But I'm sure there is. Thank you for that nudge. Yes. And it's it is a shame because wool is a sustainable product. But it's if you look at the cost associated with managing the impact it has, you know, and all the extra time and energy to do that, well it, I'm afraid it shifts that out of being sustainable.

Elizabeth Thompson 1:25:01

Sorry, just checking my - there's another question about pheromone traps. Are you using pheromone traps to track moths? Moths you know or are they a general moths pheromone? Yes for you Amber, Sarah Jane was saying that she's I'm always concerned that pheromone traps can attract new friends. If not positioned correctly.

Amber Xavier Rowe 1:25:34

No, then they're not strong enough to attract moths into your into the rooms or space. They, we do use them for webbing clothes moth, we have a very good trap made by Killgerm. It's reasonably, you know, for a pack of 10, I was just making a note because you asked me to tee up that question. It's, you know, £7.80. And we because we're only changing four times a year as well remember, so we're managing or twice a year at some sites. And we're doing it at 21 sites where we have a particular really vulnerable collection. It's our key indicator for webbing clothes moth. We do use a pheromone for the case bearing clothes moth at a some, a number of specific sites where we know we've got an issue but case bearing clothes moth is definitely less of an issue for us. And we're catching traps. We're catching off on blunder traps as well.

Elizabeth Thompson 1:26:32

if that's not a massive cost is really I mean, it is the number of sites you have. But

Amber Xavier Rowe 1:26:36

It's a key indicator because we know we can see the numbers. We can get a better picture sooner, of where we, we've got rooms with webbing clothes moth rising. Right and get in sooner to deal with it.

Elizabeth Thompson 1:26:53

Yeah. that one's been done. And this is from Margaret Birtley. In regards to Operation Clothes Moth, can you tell us more about the correlation between domestic homes and heritage properties? That is do the results from the crowd based activity correlate with your own observation of pests in English Heritage properties?

Amber Xavier Rowe 1:27:25

Well, yes, in body for I mean, the example is that we asked for, we asked people to let us know how old their property was and, and properties older than the 1950s seem to have more than issues. So there's a link with having more voids and spaces and chimneys and the way the building's constructed as being creating harborage for webbing clothes moth. The only thing I didn't correlate, which was interesting, was the amount of pale backed clothes moth, that seems to be in domestic homes, which we're not seeing at nearly the same numbers in historic houses. And I think that's probably because

we're on top of the cleaning more than might be happening in domestic homes. So I think that answers that partly

Elizabeth Thompson 1:28:24

Yeah, yeah, thank you. And another anonymous attendee would like to know, your Amber, your opinion of anoxia as a preventive treatment, okay, we, we've kind of talked a little,

Amber Xavier Rowe 1:28:40

yeah, I would, it's not practical for us to do anoxia for the various you know, things we talk about. But my main, I mean, we need to have every option, you know, not discount any, so that we, you know, from anoxia, through to heat and freezing, because, you know, we need to cover all our collections. So but personally for anoxia, when we, we, it's the length of time that you need to do it for that, that we struggle with. And also the need to you need to keep the oxygen levels down to that crucial 0.1% Whatever it is, for that period of time. And it depends on the temperature in the room. So and so and the size of the object. I know the Australian Museum, has done brilliant work with it. But, you know, it's just a personal preference and our sort of practical experience that anoxia is not an option for us for our collections in our situation.

Elizabeth Thompson 1:29:35

Yeah. Some kind of an individual with object and the institution, the decision to be made, isn't it? There's just a couple of questions. So I know we're at the end of time, but do you want to keep asking, answering a couple more? Sure. Yeah. Just just for a few more minutes.

Amber Xavier Rowe 1:29:56

It's sort of like coming up to 11.30 for me so later for you guys.

Elizabeth Thompson 1:30:00

oh it's 8.30pm so not too bad. What was the reaction of the public? And what about the conservation of the insect population, which have many benefits to the natural world and the conservation of our planet? How was this balanced?

Amber Xavier Rowe 1:30:19

yes, yes. Well, there was we did have a little bit of an episode with a mistake on the BBC website actually saying 2000 instead of two moth species were a problem. So that created a little bit of a kind of outpouring of issues around where did we, you know, we're against moths. And then others were very clear to point out that we're, you know, moths are very important we're to, to our, you know, to nature, etc. But there's only two that are really a problem. And they've moved indoors, and they've, you know, they've, they've specialized in munching stuff. So we're not

Elizabeth Thompson 1:31:04

just gonna, we're not, you're not aiming to eradicate the species as such,

Amber Xavier Rowe 1:31:09

I'll be quite happy to eradicate it. There is so there's no way we're going to not eradicate this species. They are unbelievable. They've you know, they've, they have adapted and moved indoors. And I think a lot of our insect pests are coming into museums have adapted and really are enjoying themselves. I don't think we're at any risk of decimating their species in the outdoor environment.

Elizabeth Thompson 1:31:33

Thank you. Erica Satori says, Thank you very much to you all. Excellent. points from from everyone on. On a related note, what are the best trapping methods? In your experience? We're mostly dealing with *Anobium punctatum* in our collection. Anyone?

Rehan Scharenguivel (they/them) 1:32:01

Um, depends, I guess. Yeah, like frequent checking and changing tracks. I think location is always good. If you're not getting any somewhere, but you know your objects infested, maybe you need to change your location. Non complacency is probably the best method to trapping.

Amber Xavier Rowe 1:32:18

Yeah, *Anobium*, or just is, you know, be systematic about where you're, where you're locating your traps, and, you know, keep keep that we keep the same location going forward. But but you do need to check. Beyond the traps, you need to check your collections and *Anobium* don't, depends on the weather, they will fly quite a distance. But if it's cooler, they won't. But we do count up bodies. Because we have a particular problem, we, we also count the number of actual insect pests that we're seeing. So in one store, we have a big problem with *Anobium*. And so we'd count 100, 100 bodies. And so it's a combination of of trapping and observation.

Elizabeth Thompson 1:33:01

It was interesting, when you were saying about the moths that seven, seven, were not really a problem, but then 30 something, you know, that's when you know, you've got to act, jump on it.

Amber Xavier Rowe 1:33:13

Yeah, ideally, probably 30, probably, you're probably in the middle of thick of it. So lost control of it. I mean, we Yeah, so somewhere around 15, somewhere between seven and 31. And I think that's your judgment of your knowing your situation, and whether the degree of risk from that those numbers.

Rehan Scharenguivel (they/them) 1:33:35

I guess, as a two fold approach as well, like where you do have that systematic approach of like the check the same traps every quarter I do as well. But then pinpointing, like you can put out additional traps as well as you're like, Okay, maybe they're happening over here then put more here and then you suddenly find your problem over time. Yes, that can be both at the same time, which is always helpful.

Amber Xavier Rowe 1:33:57

Yeah, that is a good point. Rehan. And we do do that when we Yeah, so we'll, we'll we'll deploy temporarily, you know, 20, or 10, pheromone moth (traps), if we can't quite pinpoint where they're coming from, to help us work out which part of that room is, where they're concentrated?

Elizabeth Thompson 1:34:14

Jessie you were gonna say something.

Jessie Gray (She/Her) 1:34:16

I was just gonna comment on sort of Amber's previous point, some of the things that we're currently building into our IPM protocols, the idea of pest thresholds, which is sort of laying out, you know, if we find high risk pests, which we've sort of, you know, categorized on a database, then, you know, finding this many high risk pests means we take, you know, this level of action, and it sort of goes down for moderate risk pests, you know, we're, you know, increased monitoring, those sorts of things. So, yeah, it's an interesting thing to add into a program. Yeah,

Amber Xavier Rowe 1:34:51

That's really, yeah, an intelligent way of doing it, because we know that yeah, you know, spiders and so forth are pretty low risk, really, but yeah, that's it. Interesting point, Jesse. Thank you.

Elizabeth Thompson 1:35:04

Jeska Matins asks, is their experience with leather or parchment materials and heat treatment? And also passes on their thanks.

Amber Xavier Rowe 1:35:18

Yes, we do have treated leather, you know, upholstery associated on furniture. Yeah. No problem. Parchment? Well, you know, depends on on the object again, you know, I wouldn't be putting the Lindisfarne Gospels through a heat treatment. So it depends on the, on the significance of the object to a degree, and to what insect pests you're dealing with, to whether you would choose to use heat, but parchment, you know, I would, I would reflect upon that before you think putting parchment through heat treatment. Right.

Elizabeth Thompson 1:35:58

Probably just one last question. This is from Lisa Addison, for Amber saying I understand from a Dave Pinneger presentation that the Australian carpet beetle is slowly colonizing the UK? Are you finding problems with them?

Amber Xavier Rowe 1:36:16

Yep, they're starting to appear in small numbers, our biggest issue is *Anthrenus verbasci* still, the sort of normal carpet beetle. But we are getting a range of other Carpet beetles coming in. Yep. Australian carpet beetle has made it. The Australian spider beetle is also prolific across our sites whether they come from Australia originally I'm not, anyway, it's called the Australian spider beetle, but I can't remember I can't remember its Latin name. You know, sort of impregnated on my brain, if I go to my poster - *Ptinus tectus* there you go.

Elizabeth Thompson 1:36:53

And is that one, a pest of a risk go to collections?

Amber Xavier Rowe 1:36:59

Yes the spider beetles are increasingly becoming Yeah, we have a range of them. And I don't know whether in the UK, but they're indicator of bird's nests. And they will move into plant material and dried food, which is not necessarily a collection, but plant material. So they're an indicator to that you've got other issues. Yeah. Other issues indeed.

Elizabeth Thompson 1:37:21

Thank you very much. I greatly enjoyed that and I could chat on for another hour, I think but we better wrap it up now. I'll pass back to Tegan so she can say goodbye to everyone, and formal thnaks. So thank you.

Tegan Anthes 1:37:40

Oh, thank you all that was so fascinating and interesting. And I certainly have a few great ideas that I can take out to the museums that I work with. I really appreciate all your all your input and innovative ideas that you've put forward tonight. I can see from from the discussion that you know, monitoring and trapping is really, it's the foundations of a good IPM. And I'm pleased that that's what I've been telling my museums. So let's hope we can discover what pests they've got. Thank you also to Elizabeth for moderating and also sharing the the survey results. And as we mentioned, we will write up those results in the AICCM newsletter for the future. So thank you all for being a part of the 10 Agents over 10 Months series. Please note that any additional questions, I'm not quite sure if there were any more, any more questions, but if they were, we aim to try and answer them on the aiccm website in the webinars section. So we might be in contact with all the speakers from tonight to follow up with some of those questions, and any other links that we didn't get.

So finally, a short promotion for the next session, which is going to be held on the 31st of August, and it's on the topic of pollutants. And now the 31st of August is a Tuesday. So we're breaking the mold for the next session. And so put that into your diaries. It will certainly be worth it. This next session we have one of the people that was asking a few questions tonight. Lisa Addison is going to present to us from the National Gallery of Australia and she's presenting about the bushfires that went through in the region in 2019 and the pollutant monitoring that they conducted there at the gallery. We also have David Thickett from English Heritage, a colleague of Ambers, and he will be presenting on a decision making tool for pollutants in display cases. And finally, we have Jean Tetreault from the CCI, and he's going to be giving us a review of pollutant controls and guidelines. So this is going to be a super interesting night on pollutants. It's going to be our sixth Agent of Change. So I hope that you will be able to join us at the end of August right at the end of August. I hope you've all enjoyed tonight's session on pests. And it's been super, super interesting. And thank you for some of the new ideas that we've been given about how to treat our agents, these agents in our collections. Thank you to everyone for attending and have a wonderful evening and we hope to see you at pollutants. Thank you