American Institute for Conservation 2014 Annual Meeting, Textile Specialty Group

Stressed about pests? A panel led discussion on Integrated Pest Management

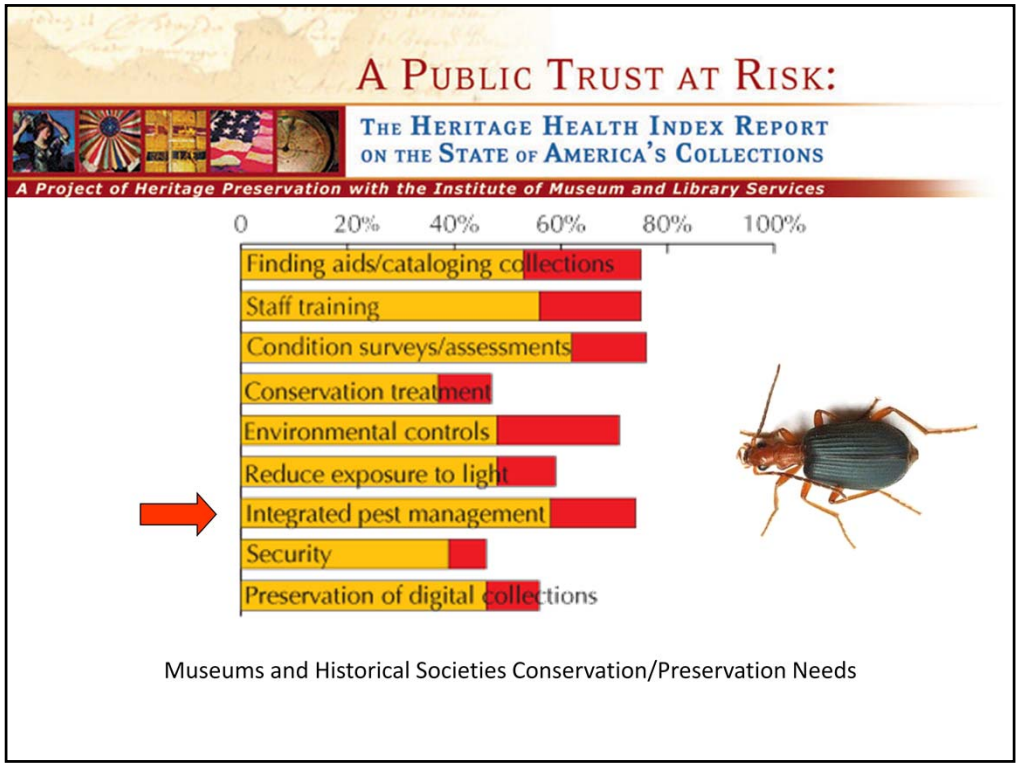
Abstract:

Integrated Pest Management (IPM) is becoming increasingly accepted by museums as a vital part of their conservation and collection care practices. IPM's comprehensive and proactive approach emphasizes pest prevention to avoid the need for drastic remedial action. The panel members will present their own diverse experiences, and then will facilitate an audience-wide discussion about the challenges presented by pests to textile and other collections.

Patty Silence, Conservator of Museum Exhibitions and Historic Interiors at the Colonial Williamsburg Foundation (CW), will discuss the challenges of implementing IPM in a large institution with historic and contemporary structures. CW's current program developed out of a one-year inter-departmental collaboration to develop a request for pricing (RFP) for a pest control contract and resulted in a Foundation-wide program, managed by a conservator and a full-time IPM technician. She will share how an all-inclusive, holistic program has saved money and time, reduced pesticide use, and most importantly improved conditions for collections, from individual items such as textiles and furniture to entire buildings.

Bernice Morris will share her experiences as IPM Coordinator at the Philadelphia Museum of Art. She will discuss the development of a written IPM policy and the challenge of making the best use of monitoring data. She will also present the systems put in place at the PMA for preventing infestations in its costume and textile collection.

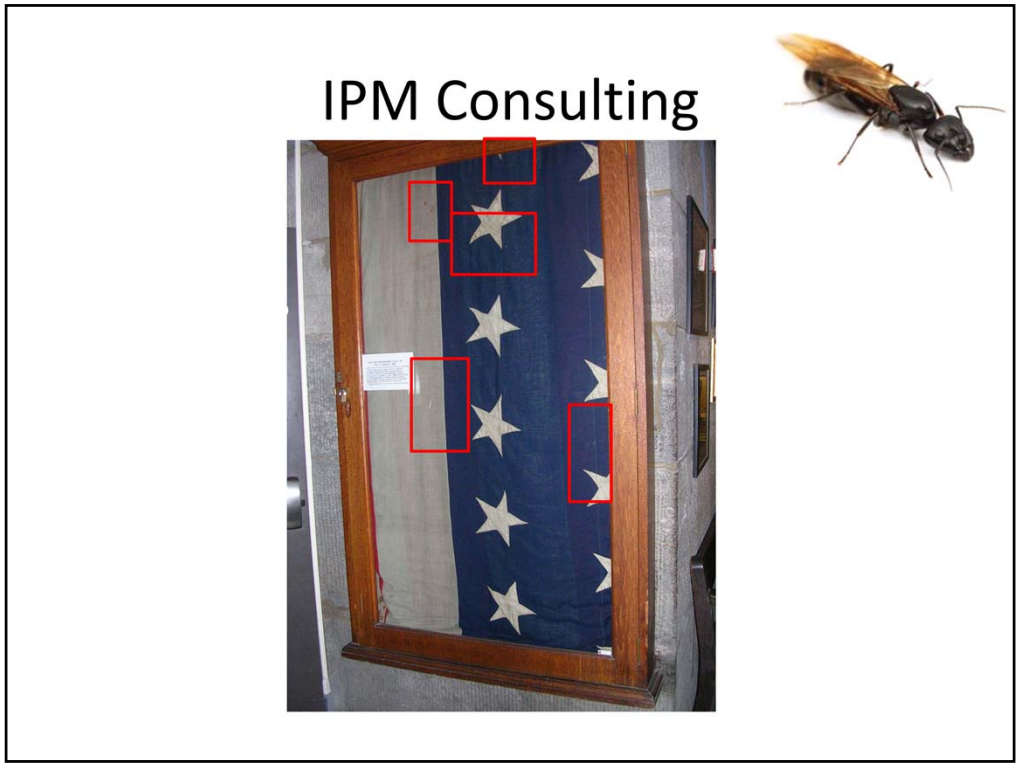
Rachael Perkins Arenstein, currently the conservator at the Bible Lands Museum Jerusalem but a former conservator in private practice at A.M. Art Conservation will speak about challenges she has seen as a consultant working with small to mid-size museums in developing pest management programs, and the resources that the IPM Working Group has developed to meet those needs.



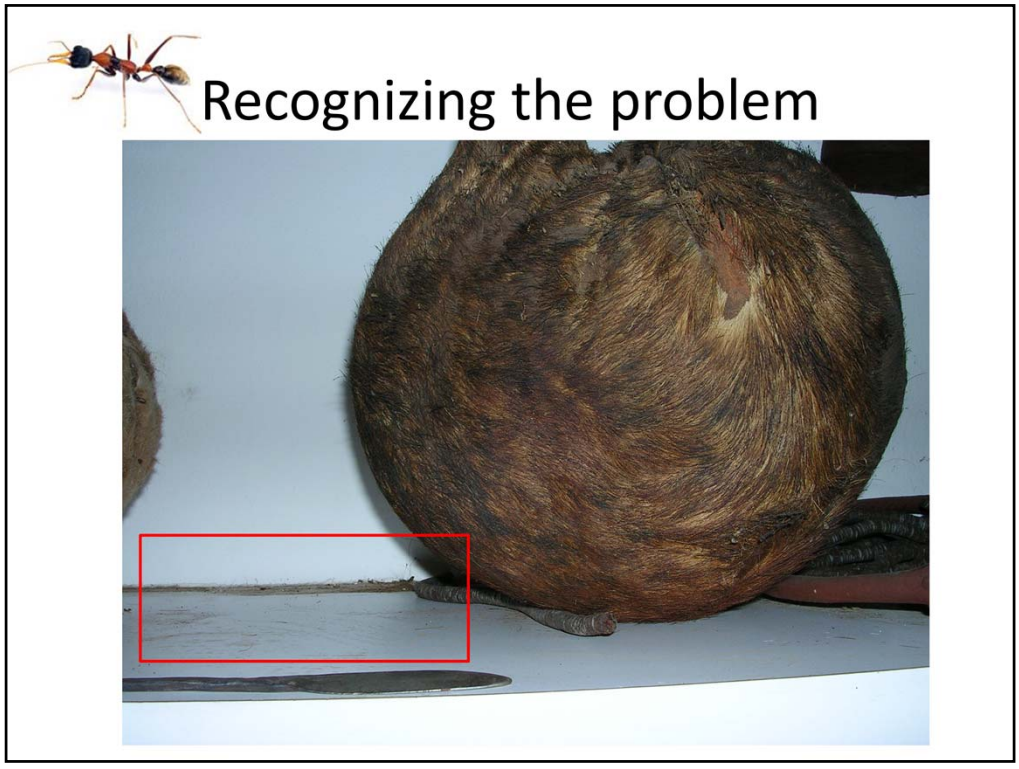
Museums and Historical Societies Conservation/Preservation Needs

I'm sure that many of you are aware of Heritage Preservation's 2005 survey investigating the state of preservation at our nation's cultural institutions which was published in 2005 as the Heritage Health Index. The survey found that approximately 75% of the museum and historical societies across the nation lacked an integrated pest management program even though 20% considered such a plan an urgent need.

I don't think this number shock you all – everyone here has probably seen how IPM can be put on the back burner in favor of more pressing problems, or tasks that can be more easily accomplished. Collections Care staff members often know that they should be doing it – but they still may be at a loss as to how and so there is still much work to be done.



In the past 10 years in private practice my business partner Eugenie Milroy and I have worked with a large number of small to mid-sized museums and we have found that virtually every one has some sort of pest issue – whether insects or rodents. What it took us some time in the beginning of our careers in private practice to realize though was that most institutions didn't even recognize the extent of their problem or how extensive the damage was. For instance the holes in the fabric of this flag were thought to be age or even light damage, not grazing from pests.



This debris here was thought just to be dust and some loose hair rather than frass and substantial hair loss from an extensive infestation.

Institutional Challenges

- Understaffed
- Elderly staff
- Under-resourced
- Overcrowded
- Grossed out

Many of these institutions share some basic challenges:

- Understaffed
- Elderly staff
- Under-resourced
- Overcrowded
- Grossed out

Let's face it, bigger institutions have the same issues but they are acute when you have a staff of three.

Basic Mistakes

1. Bad online information

2. Inappropriate products

3. Not considering health and safety of staff

Even the institutions that are doing OK in some basic preservation categories and know that managing pests is important are making some basic mistakes:

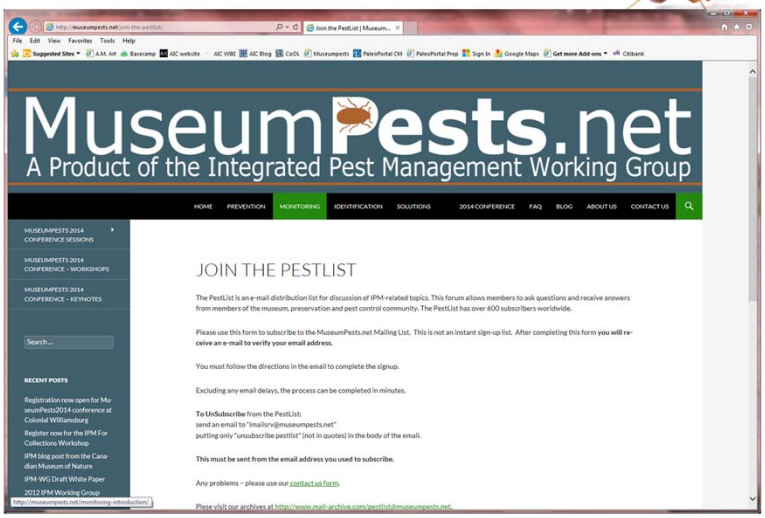
1. They are getting bad online information – for instance using sprays meant for personal use on collection items
2. And they are using inappropriate products – often thinking that natural products are safer for collections and staff
3. And they don't always recognize the dangers of products used in the past or why they shouldn't be using those pesticides now

Mission Statement

The mission of the Integrated Pest Management Working Group is to promote and facilitate best practices in pest management for the collections and cultural heritage communities.

The reason I'm here on this panel today is because of my involvement in founding the Integrated Pest Management Working Group, known as the IPMWG, which is an ad hoc group of museum and pest professionals who have been meeting for the past ten years, initially to collaborate in dealing with our own institutional pest problems, and eventually evolving into creating resources to help others identify and manage their pest issues.

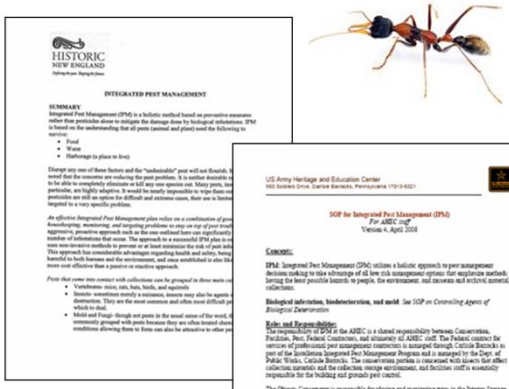
PestList Listserve



Hopefully you are familiar with our two biggest contributions: One is the PestList listserv which allows for communication on IPM concerns between 600 museum staff, entomologists and pest management professionals.

And secondly, the MuseumPests.net website where we have resources for each element of a sound IPM program including:

Prevention



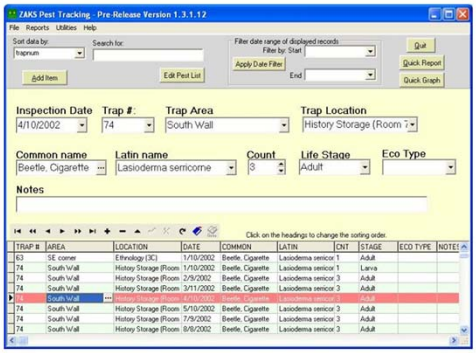
Policy and Procedure Templates

Policy and Procedure Documents

Information on prevention techniques – both physical and procedural

Monitoring

Monitoring webpage



Data collection tools

Tips for monitoring including trap selection, use of pheromones and aids for collecting and analyzing your data.

Identification Aids

MuseumPests.net
Integrated Pest Management Working Group

Odd Beetle
Thylodrias contractus (Motschulsky)

DANGER
Extremely Damaging Museum Pest

GENERAL INFORMATION

What makes the odd beetle so odd is its sexual dimorphism; the male and female of the species look nothing alike. Though the adult female is terriform in appearance it is characteristically different from the larvae as well. Larvae themselves do not appear sexually dimorphic. Though similar in appearance to other carpet beetle larvae the odd beetle is distinctive in that they lack long hairs at the tip of the abdomen and the upper body is not covered with short hairs. Rather a row of hairs exist at each segment as noted in the Diagnostic Morphology section. When disturbed the larvae curl into a C or crescent shape.

Native to Central Asia they must be introduced in order to disperse. This is largely due to the female's inability to fly. Now widely found throughout cultural institutions and other areas, they are described as a cosmopolitan species. It is likely that the species is dependent upon humans and building environments in North America.

DIAGNOSTIC MORPHOLOGY

Adult:

- Adult Male: Resting elytra meet at along top third of length, then diverge to reveal abdomen. "Long narrow body with thin appendages
- Adult Female: Wingless and larviform shaped body
- Both: 2-3mm in length - Thinly covered with short, pale hairs- clubbed, 9 segmented antennae uniform in thickness along length. - Median ocellus

Larvae

- full size ~ 3mm
- Single transverse row of hairs across the dorsum at each segment.

SIGNS OF INFESTATION

Signs of odd beetle infestation will most likely be in the form of damage to specimens and frass, the cast skins from larval insects. Objects and specimens with hair will often be surrounded by severed hairs along with frass. As the males can fly, in some rare instances flying adults may be observed.

FOOD SOURCES

In the past the odd beetle was often referred to as the "insect paper beetle" because of early literature describing an outbreak in insect paper erroneously identifying the paper as the food source. It is now thought that the beetles were feeding on whatever was in the paper. Their primary dietary preference is dried animal matter. This makes natural history collections particularly susceptible to odd beetle infestation. This includes skins, hides, fur, feathers, insect collections, and natural fiber fabrics such as silk and wool. Infestations have been observed in collections of bird nests. Odd beetles have also been observed burrowing into bone where it is thought they are attracted to the marrow or dried tissue.

LIFE CYCLE

The life cycle of the odd beetle lasts for approximately one year or slightly longer. The eggs are elliptical and a translucent white in color. They are 1mm long. After 23 – 30 days the larvae emerge. They will live the majority of their life as larvae (242-302 days), entering a short pupae stage (7-14 days) just before adulthood. The life expectancy of the adult itself is varied, living as short as nine days or surviving as much as fifty days.

CONTROL & TREATMENT

Due to the fact that females are flightless and must be introduced into a collection, prevention is the first line of defense against the odd beetle. However, once an infestation has been found thoroughly inspect and identify the scope of the infestation. This includes all storage cabinets, dermest and/or display cases. When treating an infestation be sure to include nearby cracks and fissures where pupae may be deposited.

MuseumPests.net
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Casemaking Clothes Moth
Tinea pellionella (Linnaeus)

DANGER
Extremely Damaging Museum Pest

GENERAL INFORMATION

Tinea pellionella is worldwide in distribution. Its common name of casemaking clothes moth comes from the fact that the larvae will carry a silken case with it throughout the entire larval stage until it finally uses the case to pupate in. The case consists of silken material produced by the larva intertwined with fibers from the material it is feeding on. As the larva grows, it will enlarge the case by making a slit on both sides of the case and inserting triangular sections of new material. In this stage (before it will increase the length of the case by adding new material to either end. If the case is removed from the larva when it is near pupation it will die. The larva will drag the case with it as it feeds. It will thrust out its head and thoracic legs and pull the case along with it. Immediately prior to pupation, the larva will often seek a protected site such as a crevice, wall or often the ceiling of the room of the infestation.

DIAGNOSTIC MORPHOLOGY

Adult:

- Body and wings are colored buff to golden with a brownish tinge
- Three dark spots on each front wing
- Wings are long and narrow
- Hind wings are fringed with long hairs
- 10 - 14 mm wingspan (3/8 - 1/2 in.)

Larvae

- Pale yellow in color when hatched
- As it ages it turns more white with brownish head
- Larva will always drag its silken case around with it

SIGNS OF INFESTATION

Unlike the webbing clothes moth, the Casemaking clothes moth larva will rarely spin a web on the material on which it is feeding. The larva of the Tinea pellionella will feed in a random pattern over its food source, pulling its case behind it. The amount of damage done to the material is based directly on how much time it spends in any one location. Fecal pellets from the feeding larvae will drop beneath the material or fall into folds and crevices in the textiles, rugs and furs. The cases for the pupating moths will often be attached to the wall or ceiling around the infested material. Sometimes the pupal cases will be attached to the material itself, attached only by a silk thread produced by the larva. Where webbing clothes moths (Tineola bisselliella) will often integrate their pupal cases into the fabric or fur that it feeds upon, the case for the casemaking clothes moth is distinctly separate if attached at all.

FOOD SOURCES

The food sources for this pest are wide. Potential foods could be any farthar material, woolens, rugs, furs, hair and furs (This includes animal mounts and fur garments). It is reported that it will also feed on spices, tobacco, hemp and skins.

LIFE CYCLE

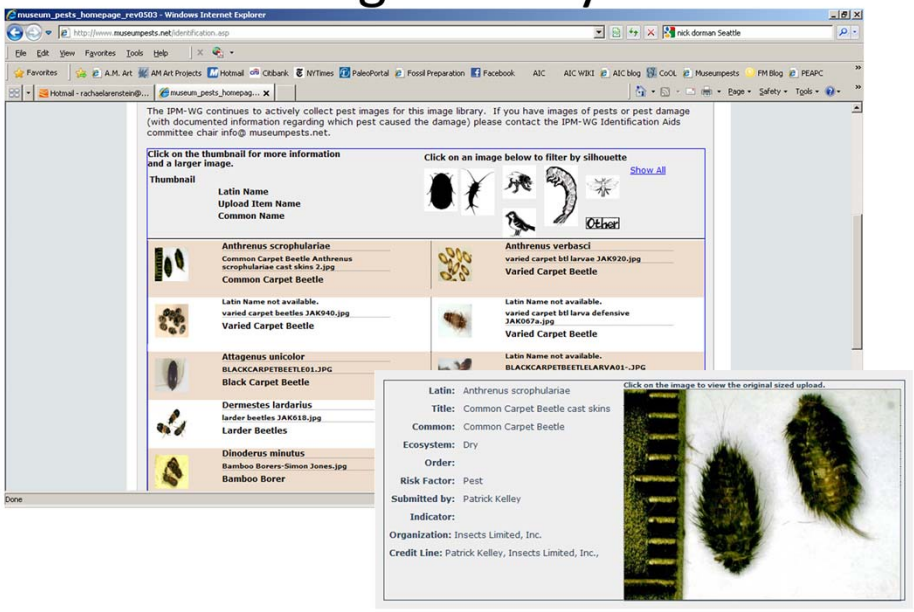
The gravid female moth will lay 37 - 40 eggs randomly over potential food sources. The eggs will hatch in 4 - 7 days. The larval stage builds a case of silk which it enlarges as it grows. The larval stage will last from 61 - 87 days. Prior to pupation, the larva will often migrate to a protected area to pupate. The whole pupation period will last 9 -19 days. The adult moths will only live 4 - 6 days. The males will be active fliers searching out the females, which generally remain stationary. A typical population will have 3 - 4 generations per year.

CONTROL & TREATMENT

Standard control and treatment methods for museum pests will generally control this pest.

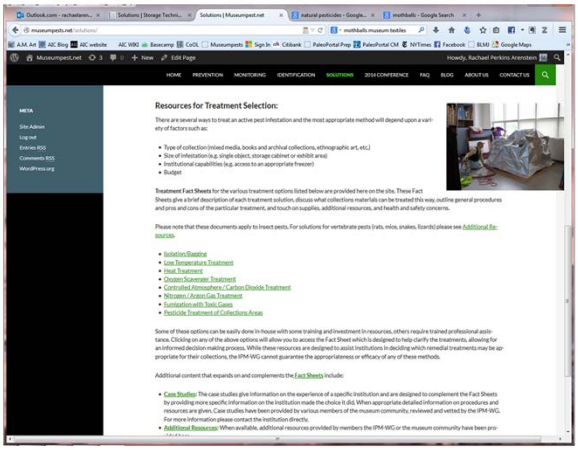
Identification aids such as our pest fact sheets

Image Library

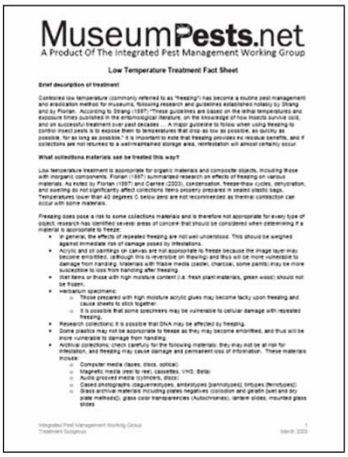


And an image library

Solutions



Treatment fact sheets and case studies



MuseumPests.net
A Product Of The Integrated Pest Management Working Group

Low Temperature Treatment Fact Sheet

Brief description of treatment

Controlled low temperature (commonly referred to as "freezing") has become a routine pest management and eradication method for museums, following research and guidelines established notably by Strang and by Florian. According to Strang (1997) "These guidelines are based on the lethal temperatures and exposure times published in the entomological literature, on the knowledge of how insects survive cold, and on successful treatment over past decades. ... A major guideline to follow when using freezing to control insect pests is to expose them to temperatures as low as low as possible, as quickly as possible, for as long as possible. ... It is important to note that freezing provides no residual benefits, and if collections are not returned to a well-maintained storage area, reinfestation will almost certainly occur.

What collections materials can be treated this way?

Low temperature treatment is appropriate for organic materials and composite objects, including those with inorganic components. Florian (1997) summarized research on effects of freezing on various materials. As noted by Florian (1997) and Cairnes (2003), condensation, freeze-thaw cycles, dehydration, and swelling do not significantly affect collections items properly prepared in sealed plastic bags. Temperatures lower than -20 degrees C below zero are not recommended as thermal contraction can occur with some materials.

Freezing does pose a risk to some collections materials and is therefore not appropriate for every type of object; research has identified several areas of concern that should be considered when determining if a material is appropriate to freeze:

- In general, the effects of repeated freezing are not well understood. This should be weighed against immediate risk of damage posed by infestations.
- Acrylic and oil paintings on canvas are not appropriate to freeze because the image layer may become embrittled, (although this is reversible on thawing) and thus will be more vulnerable to damage in handling. Materials with mixed media (paste, charcoal, some paints) may be more susceptible to loss of media from repeated freezing.
- Wet items or those with high moisture content (i.e. fresh plant materials, green wood) should not be frozen.
- Herbarium specimens:
  - Those prepared with high moisture acrylic glues may become tacky upon freezing and cause sheets to stick together.
  - It is possible that some specimens may be vulnerable to cellular damage with repeated freezing.
- Research collections: it is possible that DNA may be affected by freezing.
- Some plastics may not be appropriate to freeze as they may become embrittled, and thus will be more vulnerable to damage from handling.
- Archival collections; check carefully for the following materials; they may not be at risk for infestation, and freezing may cause damage and permanent loss of information. These materials include:
  - Computer media (tapes, discs, optical)
  - Magnetic media (reel to reel, cassettes, VHS, Beta)
  - Acetic grooved media (cylinders, discs)
  - Cased photographs (daguerreotypes, ambrotypes (painted), tintypes (ferrotypes))
  - Glass archive materials including plates negatives (collodion and gelatin (wet and dry plate methods)), glass color transparencies (Autochromes), lantern slides, mounted glass slides

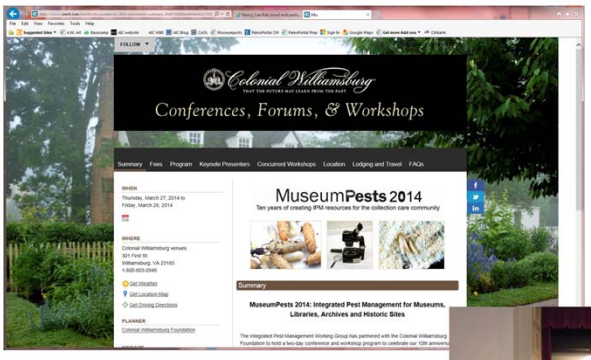
And we have information on choosing and carrying out remedial treatments when they are necessary.

In addition to our online activities, we've made some forays into the physical world teaching a workshop at AIC's 2013 annual meeting in Indianapolis.

Unmet Needs

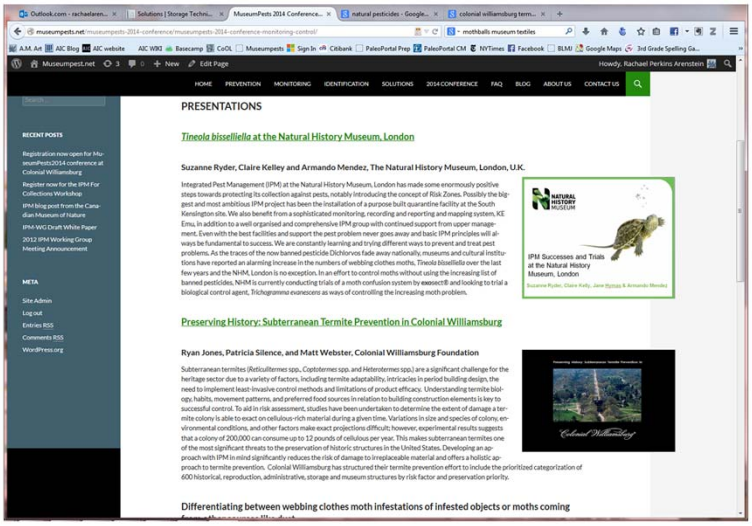
The IPMWG annual two day meetings are designed as working sessions where we create and update the material on the website. They are not training sessions in IPM but every year people contact us asking to come – which indicated that there is a real need for training that is not being met merely with online resources.

MuseumPests 2014 Conference



So, to celebrate our ten year anniversary this past March we worked with Patty and her preservation team at Colonial Williamburg to hold a conference and workshop. We had over 80 attendees including some of the leading researchers and practitioners in North America and Europe.

MuseumPests 2014 Online



Almost all the papers and posters are now available online

Don’t Lose Hope!

Despite the work we’ve done and the information we’ve put out the needs remain great and it is frustrating to combat great need and millions of pests. But we can’t just chuck it all. We have to collect ourselves and keep moving forward.

What You Can Do

1. Educate yourself on IPM
2. Offer remedial treatment services
3. Develop relationships with pest management professionals
4. Understand the health and safety concerns
5. And…

Here's a few things we believe that any conservator can and should do…

1. Educate yourself on the proper implementation of IPM
2. Offer remedial treatment services to sister institutions or as part of your client services. If you have a freezer or a bubble you can let nearby institutions use space in your units. Or invest in the materials and learn how to do safe anoxic treatments
3. Develop relationships with pest management professionals. There are some who use IPM as a buzzword but don't actually practice it and others who know their stuff. We have resources going up soon on the website to help educate PMPs on why working in museums and with collections is a different ballgame
4. Educate yourself on the health hazards of pesticides and the ways to protect yourself if you are working with contaminated collections.
5. And, last but not least…

5. Join Us!

Join us! We are always looking for new ideas on what people need to understand and implement IPM as well as new participants to help us create these resources. I hope if you have questions or ideas that you will contact me so we can continue to spread the gospel of IPM for collection care professionals.

THANK YOU

- Participants in the Integrated Pest Management Working Group and their institutions
- Leon Zak, Zak Software
- Pest images courtesy of

  Alex Wild www.myrmecos.net