ISSN Nº 1175-5288

THE CANTERBURY DISASTER SALVAGE TEAM

NEWSLETTER

Number 27 & 28
Special Combined Issue
September 2003
Editor
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Canterbury Disaster Salvage Team Annual Workshop

Integrated Pest Management – A Practical Approach

Introduction

This past April, the Canterbury Disaster Salvage Team held its annual workshop. The topic was protecting heritage collections from the ravages of our small insect and rodent friends. What mice, rats, clothes moths, silverfish, borer beetles and dermestid beetles decide to include in their diet while out in the bush is their business and is acknowledged as beneficial since it removes the 'rubbish' of the natural world. Unfortunately, when these critters enter a museum, archive or art gallery they do not realise that what is one creature's dinner is another's valuable heirloom. So while they are following the same set of rules, the playing field has changed and those of us caring for heritage collections end up fighting an ongoing battle to keep the unwanted guests from causing irreparable damage.

The one day workshop on Integrated Pest Management (IPM) theory and methods was held at the MacMillan Brown Library on the campus of the Canterbury University and was comprised of both lectures and hands-on exercises. The main focus was providing participants with a basic introduction to practical IPM techniques that they could use to quickly create policies and programmes within their institutions, as well as prevent and deal with any infestations that might occur.

The workshop began with an in depth presentation by Martin Carson, a chemist from the Kiwicare Corporation Ltd, on the variety of chemical methods that are used by the pest industry to remove infestations. It was a valuable summary of historic, current and future trends in this industry. For the remainder of the workshop, Vinod Daniel, discussed the topics of building an Integrated Pest Management (IPM) policy, risk analysis and treatment methods. Dr. Daniel is the Head of the Research Centre for Materials Conservation and the Built Environment at the Australian Museum in Sydney, Australia. He has presented courses on IPM theory and techniques throughout the Pacific and Asia.

Canterbury Disaster Salvage Team – Mandate

The Canterbury Disaster Salvage Team is a group of professionals drawn from the major cultural institutions in Christchurch. It is a non-profit organisation and all team members are volunteers.

We are able to provide the below services to the heritage community as a result of the generous support and goodwill of our employers.

Our main objectives are to provide training opportunities, disseminate information about caring for heritage collections and provide access to trained professionals and equipment in the event of an emergency for those working in the heritage sector.

MEMBERS:
Lynn Campbell, Christchurch City Art Gallery
Cynthia Cripps, Canterbury Museum
Jill Durney, Macmillan Brown Library
Andreas Eng, Canterbury University Library
Rosemary O'Neill, Christchurch City Libraries
Graham Penwell, Lincoln University Library
Tony Sellwood, RNZAF Museum
Nicola Jackson, NZ Historic Places Trust Pouhere Taonga

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Chemical Treatments for the Eradication of Pest Infestations

Martin Carson

The use of chemicals is best viewed as a 'hammer' to quickly fix an isolated problem. Chemicals are not a long-term solution. It is important to look at the 'big picture' for a longer term solution. Occurrences of pest infestations will be due to an underlying cause. Find and remove this and you will usually resolve the problem of infestation recurrences. (*For example, large amounts of vegetation around the outside perimeters of buildings can encourage insects to live and multiply in these areas. From here they can easily migrate into the building and affect collections.*)

Non-toxic pest removal methods are becoming more popular, but are they really more humane?

The most effective course of action is to prevent an infestation from occurring in the first place. Repellents, used to keep insects or rodents out of an area, are gaining in popularity. However, they do not require registration under current legislation, so some care is required to ensure the product chosen is safe for humans and collections. Environmental control is still the best preventative.

Pest Identification:

→ One live capture is too many!
→ Identification is the first step. Develop a list of specialists in your area who can assist.
→ It is important to determine if the individual found is a casual interloper or a houseguest. In other words, is he just passing through or is there a bigger colony munching away on the building or collections nearby.

Common Pests in New Zealand:

Insects – Silverfish, Borer Beetle, Dermestid Beetles, Cockroaches, Clothes Moths, and Booklice (Others such as flies, ants and spiders are more of a housekeeping problem or may indicate the start of a bigger pest problem.)
Moulds – Aspergillus, Penicillium, (Basidiomycetes), Cladosporium, and Pullularia (Mould is always present in the environment. The key is to control the amount and discourage germination of the spores.)
Vertebrates – Mice, Rats, Possums and Birds.

Eradication Methods:

1 *Chemical* – Pesticides, Pheromones, Repellents
   → Natural sources (e.g. cedar oil) - have variable efficacy and can have similar drawbacks as synthetics
   → Organochlorine (1945, first synthetic) - e.g. DDT (now banned), have high acute and high chronic mortality (*in the pests, not great for humans either*)
   → Organophosphate – may cause cancer in humans, less toxic to pests than the chlorine based compounds
   → Carbamates – may cause cancer in humans, no long-term toxicity effect on pests
   → Synthetic Pyrethroids – early versions had a higher toxicity to those available today
   → New Compounds (Fipronil, Insect Growth Regulators, etc) - lower toxicity and target specific pests
   › Biological Controls – possible trend for future, examples include the use of a specially modified bacteria in controlling the painted applemoth
2 *Physical* – Heat, Cold, Moisture, Oxygen control
   → Make environment either unsuitable so as to discourage pests, or unliveable in order to destroy pests
3 *Non-Toxic* – Traps, Glue Boards, Derris dust

Delivery Methods – Chemical Controls:

→ Total Release Fumigators (e.g. aerosols such as 'bug bombs')
→ Spot Treatments (e.g. bait stations)

Conclusions:

1 Research and implement an Integrated Pest Management Program
2 Monitor and Document
3 Utilise the best available tools to best effect
4 Keep up to date with new developments

Integrated Pest Management Policy (Procedures)

Dr. Vinod Daniel

1 Implement Strategies to Prevent Infestations
   A) Cultural Control
      → Create an environment that pests don't like
      → Control temperature and humidity to levels that discourage habitation or breeding
      › Remove potential homes and breeding sites (i.e. live plants, rubbish)
      → Remove greenery around the perimeter of the building and discourage birds nesting (nests contain insects as well as eggs)
      → Use housekeeping methods that won't encourage pests (e.g. minimise the use of water to clean floors as this raises the humidity and insects like high humidity)
   B) Physical Control
      › Alter the physical environment to stop pests entering the building
      › Isolate infested materials using sealed bags or boxes to stop the pest from spreading to other areas
      → Close gaps at the bottom of doors
      › Light colour shelving helps by making it easier to see pests and dust accumulation
      → Create a robust housekeeping programme to reduce dirt and dust
   C) Chemical Control
      → Careful selection and application when and as required (refer to previous discussion by Martin Carson)
   D) Monitoring and Evaluation
      → Requires a co-ordinated effort and must involve all staff
      › Regular inspections of building and collections
      → Different types of traps can be used, will depend on pest being targeted (e.g. pheromone versus 'blunder' traps)
      → Important to place traps where most likely to encounter pest being targeted (e.g. flying versus crawling pests)
      → Map out findings to determine 'hot spots' in building and seasonal effects

2 Non-Toxic Methods to Treat Infestations When They Occur
   → Include heating, freezing and low oxygen environments
   → Have no lasting effect, collections items can become re-infested if the original cause of the infestation is not eliminated
   → Insects thrive at temperatures between +10 to +35

degrees Celsius

A. *Freezing:* -20 degrees Celsius for 7 days will kill all insect stages (i.e. egg through to adult)
   - → Seal object to be treated in a plastic bag or box
   - › Use a moisture buffer around metal components to decrease condensation and prevent corrosion (e.g. wrap in tissue paper)
   - › Provide support for fragile components
   - → After 7 days, remove from freezer and – leaving sealed in bag or box – let sit at room temperature for 24 hours
   - › Freezing can cause dimensional changes in objects which may lead to damage (e.g. paint)
   - → Objects will become brittle, so great care is necessary while handling to prevent accidental damage
   - → Has been used by heritage institutions for 40-50 years to date, so a great deal of data exists to support methods

Use Extreme Care in Freezing the Following:
- Paintings on canvas
- Ivory
- Deteriorating glass
- High-fired ceramics (e.g. porcelain)
- Water-logged objects
- Wax
- Loose paint on wood
- Wooden objects with joins (e.g. furniture, panel paintings, etc.)

These materials may be damaged by the freezing process.

B. *Heating:* 52 degrees Celsius for 4 hours will kill all insect stages
   - → Widely used commercial technique in North America (hot air pumped into buildings wrapped in insulating material)
   - → Expensive (commercial versions)
   - → Drying out can be a problem, as well as melting of heat sensitive materials
   - → Can be done cheaply by wrapping the object in black plastic film, enclosing this in clear plastic, then put on surface raised off the ground and place in direct sunlight for 6 hours
   - → Be careful not to wrap the object too tightly, wrap metal with tissue to protect it from corrosion
   - → Support fragile components
   - → This is a newer treatment method, so less data is available and many aspects still being 'tweaked'

Use Extreme Care in Heating the Following:
- Waxes
- Varnishes
- Paint
- Adhesives
- Materials sensitive to drying conditions
- Brittle materials
- Wet materials
- Plastics
- Rubbers

These materials may be damaged by high temperatures.

C. *Low Oxygen*
   - › Kills insects through desiccation not suffocation by forcing the trachea open too long. This leads to excessive moisture loss.
   - → Less than 0.3% Oxygen for 14 days at 25 degrees Celsius and 55% Relative Humidity will kill all insect stages
   - → Systems can be static or dynamic
   - → Dynamic systems use either Nitrogen or Carbon Dioxide gas
   - → Static systems use a special compound that absorbs oxygen

Static System:
- Seal object in a bag with an oxygen scavenging material to create an isolated low-oxygen environment for a minimum of 20 days
- Use an oxygen scavenger such as *Ageless* (Mitsubishi product available through Auckland office)
- Reaction of oxygen with scavenging material in *Ageless* exothermic (i.e. produces heat), so keep it from contacting the object
- Standard plastic films are oxygen permeable, it is necessary to use a vapour barrier film such a *Cryovac, ACLAR* or *Marvelseal*
- Can use an oxygen indicator (Mitsubishi product available through Auckland office) to show the rough percentage of oxygen present

Dynamic System:
- Safety risks involved with these systems
- A continuous flow of nitrogen (or carbon dioxide) gas within a sealed environment is used to produce and maintain low oxygen conditions
- Often necessary with larger objects
- Is expensive
- Humidity can get very low and put sensitive objects at risk
- Carbon dioxide has more health and safety issues than nitrogen

3 Risk Analysis
   - → Provides a logical, rational framework to assess dangers and present results to management and funding sources
   - → Categorise risks by likelihood of occurring (i.e. rare, sporadic or constant) and effect of occurrence (i.e. minor, moderate, catastrophic)
   - › Prioritise results – an event that happens constantly and has a catastrophic effect will be a higher priority than one that occurs rarely and has only a minor effect
   - → Use the priority list to determine the timeframe for addressing the risks (e.g. short term, mid-term and long term)

10 Factors That Cause Damage
(Canadian Conservation Institute – Risk Analysis)
1. Direct Physical Forces (e.g. poor handling, earthquake)
2. Thieves, Vandals, Displacers (intentional or unintentional)
3. Fire
4. Water
5. Pests
6. Contaminants (i.e. pollution, grease, dust, etc.)
7. Radiation (i.e. ultra-violet light)
8. Incorrect Temperature (i.e. too high or too low)
9. Incorrect Relative Humidity (i.e. severe fluctuations)
10. Custodial Neglect (i.e. poor training of staff and volunteers)

If you have any concerns about treating a collection item, contact a conservator in your area for advice.

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WEBSITES

Australian Association for the Conservation of Cultural Materials (AICCM)
http://www.aiccm.org.au/aiccm/home/

Heritage Preservation
http://www.heritagepreservation.org/

Northeast Document Conservation Center, *Conserve O Grams*
http://www.cr.nps.gov/museum/publications/conserveogram/cons_toc.html

Western Association for Art Conservation (WAAC)
http://palimpsest.stanford.edu/waac/

Conservation OnLine (CoOL)
http://palimpsest.stanford.edu/

New Zealand Professional Conservators Group
http://www.conservators.org.nz/

Canterbury Disaster Salvage Team
Annual Workshop 2004
Workshop Fee Waiver Offer

As a reflection of the concerns expressed at previous workshops to the CDST members by representatives from smaller institutions, as well as a desire by the CDST to reach as many people working in the heritage sector as possible, the members are pleased to announce that this year we will be offering 5 free seats at the annual workshop. These seats will be for those small, mainly volunteer-based heritage sites, museums, and art galleries, that have difficulty accommodating the cost of such workshops within limited budgets.

To be eligible, the organisation must be operated primarily by volunteers and have a maximum of two paid employees.

If you would like to apply for one of these seats, please fill out and return the enclosed application form.