AMERICAN MUSEUM OF NATURAL HISTORY
DIVISION OF PALEONTOLOGY PEST MANAGEMENT POLICY

The threat of pest infestations is a constant and major concern for museum collections. This chapter outlines a series of general principles and long-term goals to help in the prevention and treatment of pest outbreaks in the Division of Paleontology and throughout the Museum. While paleontology collections are not normally seen as vulnerable to pest attack, pests are capable of causing damage to associated materials such as labels, padding materials, archival items, or drawers or cabinets; they may be attracted to and cause damage to consolidants and adhesives; and may also cause direct damage to sub-fossil specimens. In the absence of pest management, the Division's collection and office spaces may also act as a reservoir for pest infestations in the more vulnerable collections of other departments.

The objectives of the divisional pest management procedures are as follows:

- To aid in collection management decisions rather than being proscriptive, with the understanding that circumstances may vary widely among the collections or their subsets.
- To develop goals and practices that are consistent with AMNH Safety and OSHA regulations.
- To establish a foundation for effective communication with non-scientific departments, such as Facilities Operations and Custodial Services.
- To facilitate a swift and unified response to pest problems among scientific departments with the understanding that the achievable goal is management; no policy will ever eradicate the pest problem.

The first, and most fundamental step in pest management is ***prevention***, followed up by ***monitoring*** and, if necessary, ***elimination***.

Prevention

A. Containment of collections and collection areas

1. *Building structure.* Areas for or near collections must be inspected for damage (e.g., holes, cracks) and repaired immediately. Drop ceilings should be avoided or eliminated in collection areas because they hide problems and are difficult to monitor. The junction between walls and floors should be sealed – baseboards can shelter pests.
    - conduct a professional building survey
    - repair walls and roofs as necessary
    - block holes in floors, ceilings
    - eliminate inaccessible space in collection areas (e.g., drop ceilings)
    - seal floors

2. *Doors and window seals.* Doors should be closed to outside areas to prevent the introduction of pests, either from outside or public areas. All doors in collections or rooms that are potential problems (e.g., live animal room, multiple-person offices) should have door sweeps. Windows in or near collection areas should remain closed at all times. Doors and windows should be inspected frequently and problems, such as with seals and access (e.g., damaged A/C units), corrected.
    - fit door sweeps
    - conduct a professional survey of windows
    - repair/replace damaged A/C units

3. *Cabinets.* Cabinets protect collections from light as well as pests. Cabinets should be designed to exclude pests. They should be regularly monitored for faulty seals and maintenance problems. Doors should remain closed at all times except when working on specimens in the cabinet. Specimens in offices and preparation areas should be kept in cabinets when not in use.
    - set standards for cabinet construction (e.g., gaskets, caulking)
    - survey and record cabinet types/numbers
    - eliminate inaccessible spaces within cabinets
    - where possible, raise cabinets 6" from floor

B. Environment of collections areas

1. *Temperature and Humidity.* High temperature and relative humidity (RH) promote pest activity. Fluctuations in temperature and RH can also cause damage to collections. The ultimate goal for the division and Museum should be climate control in all collections areas. As a first step, dataloggers should be placed throughout the collection areas to monitor the environment (number per room dependent on size and shape of room).
    - set parameters (65F +/- 5F for collection spaces, RH 50% +/- 5%)
    - survey and overhaul independent A/C units
    - conduct feasibility study to initiate environmental controls
    - comprehensive HVAC as ultimate goal for all collection areas

2. *Cleaning.* Cleaning the cabinets and collection area removes shelter and food for pests. Clutter or trash should not be allowed to accumulate, and packing “peanuts” made of cellulose should be discarded. Collection areas should be cleaned regularly by the museum cleaning crew (see also part A[2] in Monitoring, Deterrence, and Elimination section). A major cleaning should be arranged annually in the spring for all spaces in all departments and should include non-collection areas, such as stairways, elevators and landings, emergency egress routes, etc. as a precaution prior to bug season.
    - regular cleaning of *all* departmental spaces

- "spring clean"
- do not allow organic material build-up on surfaces, especially floors
- remove "clutter" from floors

C. Contamination

1. *Isolation of collections.* Collection areas should be separate from other department functions, especially offices. Food and drinks should be prohibited in the collection areas. In all other departmental areas (including offices) particular care must be taken concerning food/drink; 1) food containers should not be left open, 2) dropped food should be *cleaned up immediately,* and 3) all food products should be thrown away in designated food disposal points.
   - aim to completely separate office and collections space
   - physically isolate collection spaces
   - do not house new staff or students in collections spaces
   - control eating and drinking in department
   - install designated food disposal points
   - do not place potted plants in collections areas

2. *Accidental introductions.* All dry specimens arriving from outside the department (e.g., new, loan, loan return) should be inspected for signs of pests. Packing materials should be discarded and new specimen trays and conservation-grade padding provided if necessary. Minimize the risk of pests entering the building by keeping windows closed and switching off lights when rooms are not in use. Maintain barriers between pests and specimens by keeping cabinets closed.
   - keep all windows closed at all times
   - do not leave lights on
   - treat all incoming and outgoing specimens
   - provide holding cases for staff, and others as appropriate
   - do not leave cases open

Monitoring, Deterrence, and Elimination

A. Collection Area

1. *Trapping.* Insect traps should be placed throughout collection areas and corridors and in other problem areas throughout the Division. If necessary, other traps (e.g., mammal) should also be used. These traps should be inspected and contents noted on a regular basis.
   - conduct regular, systematic trapping
   - record all incidents, set up ID pathway for pests trapped
   - central register of incidents as ultimate goal

2. *Tempo.* If evidence of regular infestation emerges from trapping, the affected collection areas and corridors should be sprayed with a chemical deterrent (Tempo currently is preferred) approximately every three months. The collections should be thoroughly cleaned and mopped by AMNH Housekeeping staff (see part B[2] in Prevention section) before the perimeter of the floor is sprayed.

- use Tempo in all collections areas and corridors where evidence of infestation is discovered

B. Collections

1. *Freezing.* Freezing should be used as the main elimination (e.g., control of pest outbreak) procedure.
   - shift towards use of freezing for treatment of all outbreaks
   - make arrangements to use Mammalogy ultra cold freezer whenever possible
   - for large-scale outbreaks: make arrangements to use -20°C freezer walk-in in the VZ osteology lab

2. *Naphthalene.* Where recent materials are stored in cabinets, this chemical should be used as a day-to-day deterrent placed directly within the cabinets.
   - use as day-to-day deterrent (ca. 10g/ft^3)
   - eventual aim: high quality cabinetry will make naphthalene redundant

Reporting

Any sightings of known pests (e.g., cockroaches, dermestid beetles, silverfish, book lice, mice, rats), mold outbreaks, or unusual insects in the Division should be reported to the Director of Collections and Archives, and then to the Museum's Pest Control officer.

The Director of Collections and Archives will be responsible for liaison with the Director of Custodial Services, Conservator of Natural Science Collections, Divisional Chair, Associate Dean of Science for Collections, and any other relevant parties within the Museum regarding outbreaks.

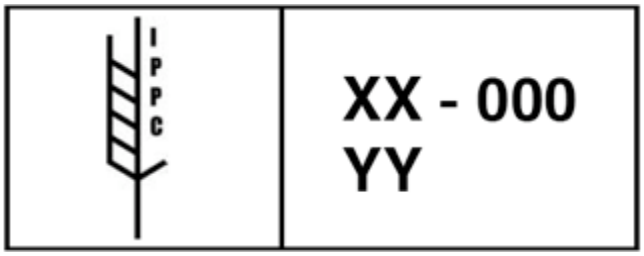
Use of Solid Wood Packing Materials (SWPM)

A particular issue affecting the transport of paleontological specimens into the Museum is the use of solid wood packing materials. SWPM refers to primary wood packing materials other than loose wood packing materials used for, or for use, with cargo to prevent damage including, but not limited to, dunnage, crating, pallets, packing blocks, drums, cases and skids. Plywood, together with other synthetic or highly processed wood materials, are **not** subject to the

requirements of SWPM control. SWPM are often used in the construction of crates used to transport specimens from the field.

SWPM is vulnerable to attack by wood boring insects; crates and pallets made from untreated wood are thought to have been the source of the 1996 outbreak of Asiatic long-horned beetle (*Anoplophora glabripennis*) in New York and New Jersey. Such invasive species represent a significant threat to US forestry and agriculture. In the museum environment they may cause serious damage to untreated wood artifacts, furniture, and structural timbers.

Because of the threat represented by wood-boring beetles, in September 2005 the US implemented a law stating that all SWPM entering the country must have been either heat-treated or Methyl Bromide fumigated. Wood that has been treated in this way receives a stamp, an example of which is shown below:



where ‘XX’ is a two letter country code, followed by a three digit number identifying the company that produced the packing material.

Any members of the Division undertaking fieldwork overseas should be aware that timber purchased overseas for the purpose of constructing crates must have undergone heat treatment or fumigation and must have been stamped to prove this prior to importation to the US.

Given that obtaining treated timber may be difficult or impossible in many areas where fieldwork is conducted, serious consideration should be given to using shipping containers made from other materials, such as plastic or metal.

In the event that wood has to be used, a treated timber supplier in the country in question should be identified in advance; SWPM can then be purchased and transported into the field at the start of the field season.

Failure to use appropriately treated SWPM, and to provide evidence of such when shipping specimens into the country, may be grounds for **denial of entry**, **destruction of the shipment,** and **legal sanctions including fines.**