

DRAFT **Integrated Preventive Pest Management**
Site Inspection and Program **DRAFT**

Jean Lafitte National Historical Park and Preserve
French Quarter Visitor Center
419 Decatur Street
New Orleans, Louisiana 70130

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**Jean Lafitte National Historical Park and Preserve
French Quarter Visitor Center**

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INTRODUCTION

The Jean Lafitte National Historical Park and Preserve is comprised of six sites: the Prairie Acadian Cultural Center, Acadian Cultural Center, Wetlands Acadian Cultural Center, Barataria Preserve, Chalmette Battlefield, and French Quarter Visitor Center. The Chalmette Battlefield facility was destroyed during Hurricane Katrina and is currently being rebuilt.

This IPPM site inspection and program report was conducted for the French Quarter Visitor Center. The Visitor Center is located on Decatur Street in New Orleans and faces the Mississippi River. It is of masonry and brick construction of basically four buildings from front to rear, with an enclosed carriage way and courtyard on the right side. The portion of the Visitor Center fronting on Decatur Street is a three-story renovated structure. Immediately behind and attached to it is a two-story modern building with first floor public bathrooms and second-story offices. Building #3 is an older, brick building, attached to Building #2 and contains two floors. The lower floor houses a demonstration kitchen and the upper floor is office space. The last Building, #4, has been rebuilt utilizing bricks of the original structure and is two stories high. The lower floor houses maintenance areas and an auditorium and the upper floor has offices.

In October of 1987, a draft of an Integrated Pest Management Plan for the Jean Lafitte National Historical Park and Preserve was recommended by the Superintendent. This 61 page program apparently was never approved by the Southwest Regional administration. It therefore was never officially implemented. Kathryn A. Lang, Curator, implemented a glueboard trapping program at the six sites in 1988. Subsequently, she developed a more formal, nine-page JELA Curatorial IPM Program in 2003, which outlined the importance of the program and specifics on reporting glueboard catches. Therefore, since at least 1988, this program has generated data on the types of pests trapped with the glueboard program, with results identified and tabulated by Kathryn A. Lang.

DISCUSSION

Administrators of facilities housing cultural materials must consider the exterior condition of a structure, or what is commonly referred to as the building envelope, and its interior utilities in particular, when assessing the pressure pests place on a building and the foci of possible infestations. As caretakers of such facilities, management and professional pest management personnel must be keenly aware of deficiencies which may lead to invasion and establishment of pests in a structure.

Not unlike human beings, with the onset of age, building systems begin to break down. Humans experience system malfunction and failure, often coupled with the onset of disease. With buildings, garage and personnel doors, windows, and even some of the exterior walls, through wear and modification, become highways for pest ingress. On the interior, electrical systems become outdated and undersized for the increasing demands for power. Old cast iron sewerage systems, in particular, begin to rust away and break, leaving openings for rodents and American cockroaches to walk into a building. Drains dry out and provide highways into a building for cockroaches and sewer or moth flies. Old ejector pits generate harborage for cockroaches, which then fan out all over the building at night looking for food and mating opportunities.

In dealing with the types of pests which commonly infest buildings, one must consider:

- A. the manner in which a building may become infested,
- B. vermin routes of entry into the physical structure,
- C. the original construction and additions to a building,
- D. the kinds of pests which threaten specific collections in a building,
- E. policies and procedures which might unwittingly introduce pests,
- F. storage practices, shelving and equipment,
- G. maintenance and housekeeping practices,
- H. and the external pressure from pests found in the environs in which the building is situated.

The term "Integrated Pest Management" (IPM) has been coined to embody the concept where all pest control programs must rely on several approaches working in concert to produce a pest-free environment. With respect to maintaining a pest-free environment on the interior of a building, this term should actually be called IPPM; that is, Integrated **Preventive** Pest Management. A proactive, holistic approach must be taken by management to prevent pest infestation, not to simply address individual situations as they arise. It is particularly important an integrated approach be considered when setting up IPPM programs for structures housing cultural materials and historic houses. Certain groups, sections, and personalities must not be allowed to escape the responsibility of joining in this team effort. Members of all management disciplines should be included in the nucleus of an IPPM committee. It is hoped the following report will be used as a basis for the IPPM oversight committee to establish an Integrated Preventive Pest Management program for the buildings at the French Quarter Visitor Center.

Damage to structures and the infestation of buildings is primarily caused by cockroaches, silverfish, carpet beetles, clothes moths, rodents, birds, mammals, bats, and mold. Most of these pests consider these situations not unlike the setting in agriculture where huge quantities of foodstuffs are stored for long periods of time. The structures are a concentration of foodstuffs including starches, cellulose, and proteins which form their banquet. They also act as harborage for invading vermin. We must first determine the pressures put on the structure and specific interior areas from pests and then devise means of keeping them from gaining access to susceptible materials.

The objectives of any Integrated Preventive Pest Management program are as follows:

1. To devise and institute a thorough housekeeping program, placing emphasis on routine vacuuming of susceptible areas, storage areas, public areas, food handling areas, and basements. Removal of clutter is paramount.
2. To design and install exterior lighting which will not be attractive to night-flying insects.
3. To make the structure as tight as possible to prevent invasion from insects, rodents, mammals, bats, and birds.
4. To repair, modify and install guttering on the structures in such a way as to prevent destruction from rot and insects caused by water problems.
5. To make the structure uninviting for nesting and roosting of birds, rodents, bats, and other vermin.
6. To install non-chemical methods of trapping rodents and insects on the interior, which may get past our initial defenses.
7. To modify existing elements of the building to prevent invasion and travel of pests throughout the facility.
8. To maintain a monitoring program developed and implemented by a contract, professional pest control service and/or the IPPM committee in order to channel all aspects of this effort through the chairperson of this committee.
9. To provide relevant training for staff so they may understand the importance of the program and assist in its implementation.

This illustrated, narrative report is based on inspections of the collections stored and on display in the French Quarter Visitor Center and the building itself. The inspection was conducted on November 5, 2009. All of the susceptible collections on exhibit, in storage, and the building itself were inspected. A careful flashlight inspection was performed for the collections and on the interior and exterior of the structure. Photographs of situations where activity was found or suspected were taken, as well as those of structural anomalies, which may have actual or lead to subsequent infestation. Twenty-seven photographs are included with this report to guide staff in its implementation of an IPPM program.

ACTUAL AND POTENTIAL PEST PROBLEMS

Mice

The Visitor Center has occasional invasions of mice. These mice are mostly the common house mouse. Mice put pressure on buildings, particularly in the fall of the year, seeking shelter for the cooler months. Some may consider mice cute, but unfortunately they may harbor diseases, which may be transmitted to man. These diseases may be transmitted by ticks, which feed on wild mice or in the urine and fecal matter of mice. Of particular concern may be Hantavirus and Lyme disease. The transmission of disease by mice is much more possible in a natural, rural setting than in an urban setting where the Visitor Center is located. Mouse control and prevention is important in any setting where cultural materials are housed. The primary line of defense against mouse invasions is to insure the building envelope is made as tight as possible. Although I do not consider the likelihood of mice harboring these diseases in an urban setting to be high, I have included Addenda concerning the role mice play in these diseases.

American Cockroach (*Periplaneta americana* Linn.)

The Visitor Center has been under intense pressure from American cockroach invasion for many years. Public sewer systems are heavily populated with these cockroaches. They commonly make their way into buildings via dry floor drains, sinks, showers, bathtubs, and stand pipes. In New Orleans, they simply fly and walk to buildings, often climbing up the sides of buildings to gain entry into upper levels. The heavy populations of American cockroaches on the second floor of Buildings 2 and 3 of the Visitor Center will be thoroughly addressed in this report. These cockroaches have strong mandibles and can damage cultural collections. More information about this type of cockroach may be found in the Appendices.

Occasional Invaders

Based on the findings on the interior of the four structures, several different kinds of pests simply walk or fly into the buildings. They include, but are not limited to millipedes, sow bugs, ants, ground beetles and other types of beetles, various types of moths, and cockroaches. Being surrounded by sidewalks and paving, the Visitor Center does not seem to have excessive pressure from sow bugs, millipedes, or ground beetles. A small infestation of ants was found during the inspection. However, American cockroaches are putting extensive pressure on these structures, which will be detailed later in this report.

Silverfish

Certain items in storage and found in mechanical areas were found to have silverfish feeding damage. Silverfish thrive in cool, moist conditions. This building, with its moist mechanical rooms, is ideal for silverfish infestations. An inspection should be made of all closets, storage areas, and mechanical rooms to determine if stored materials are valuable. If not, they should be discarded. If susceptible items are to be stored for any period of time, they should be placed in garbage bags and tightly sealed.

INSPECTION

Exterior – The Building Envelope

The IPPM site inspection of the Jean Lafitte National Historical Park and Preserve French Quarter Visitor Center began at the front of the building, as shown in Photograph 1. The photo shows the combination of a red and yellow building, with the first floor doors painted green. The first floor of this portion of the building houses store-front exhibits, mechanical areas, offices, an elevator, and at the rear, a walk-through exhibit and sales area. The covered carriage way can be seen to the right of the green doors. The public is encouraged to walk the length of the carriage way into a courtyard and then make a U-turn into the visitors' exhibit area. Doorways lining the left side of the carriage way, as well as some of the green, front doors, are open to pest ingress and should be addressed.



Photograph 1. The Jean Lafitte National Historical Park and Preserve French Quarter Visitors Center. The public entrance to exhibits is at the rear of the covered carriage way, shown on the right side of the green doors. This site faces Decatur Street.

As the public exits the rear of the carriage way, Buildings 3 through 4 can be seen on the left side. A courtyard and garden are on the right side. Building 2 houses public bathrooms. Building 3, the closest one in Photograph 2, houses a demonstration kitchen on the first floor and offices on the second. Building 4, in the background, houses an auditorium on the first floor and some mechanical areas. The second floor is devoted to offices. The bottoms of several of these doors in both structures have gaps, which allow pest ingress.



Photograph 2. Buildings 3 and 4 of the French Quarter Visitor Center complex.

The courtyard and gardens are located adjacent to Buildings 2 through 4. Some mention was made of possible rat infestation of the earthen areas of the planted gardens. A professional pest management firm should be contacted for an inspection of this area for signs of rodent activity. If found, a rodent baiting program can be instituted in the planted areas. Locked rodent bait stations strategically placed in the planted areas should eliminate any localized infestation. Such a rat control project should not be undertaken by staff themselves because all rodent bait materials are considered Restricted Use to be used only by licensed and certified professionals.



Photograph 3. The planted courtyard flanking Buildings 2 through 4.

At the front of the building are a series of double, wooden doors, as shown in Photograph 4. Several of these doors have gaps beneath them, which allow pests to enter the building. Bottom brush sweepers should be installed on all of these doors to prevent pest ingress.

It has been relayed to me this entire first floor façade of green doors and windows is to be completely renovated in the near future. If so, perhaps all of these doors will be eliminated or at least replaced with more modern, tight-fitting ones. In addition, this very hot exhibit area hopefully will be equipped with an HVAC system, which will condition the air of this shallow space. Currently this space is not climate-controlled, which is not the best situation for the artifacts on display.

Photograph 5 shows a sewer manhole cover in the brick sidewalk immediately in front of the first floor green doors. Holes on either side of the round cover allow a worker to insert a pry bar in order to lift the cover. These holes should be stuffed with copper wool gauze. American cockroaches populate sewer systems. They can easily exit the sewer via these holes and then may gain access to the building. By plugging the holes, cockroach pressure on the building from the sewer will be reduced.



Photograph 4. Substantial gaps beneath the double, wooden front doors.



Photograph 5. A sewer manhole cover in the sidewalk immediately in front of the green doors leading to the building.



Photograph 6. An English sparrow nest above the green doors.

Bird nesting can be easily prevented by installing strips of Nixalite® in the gap where this nest is located. Nixalite® is available in lengths of a stainless steel, barbed device, which can be permanently installed and prevent nesting and roosting. Information about this product can be found in the Appendices.



Photograph 7. A door leading to a mechanical area at the front of the carriage way.

The covered, brick carriage way along the right side of the building has a series of doors leading into the main portion of the building. Many of these doors have large gaps beneath them, which will require the installation of bottom brush sweepers to prevent pest ingress. Photograph 7 is one example of such a door. Information about Sealeze AstraSweep™ brush sweepers can be found in the Appendices.



Photograph 8. The double doors leading to the demonstration kitchen.

The inspection proceeded towards the rear of the complex. Outside the demonstration kitchen in Building 3, there was a set of double doors, shown in Photograph 8, which obviously would allow insect and rodent ingress. These doors should have brush sweepers installed.

Building 4 was reconstructed in the past, utilizing many of the bricks from the original building. One piece of evidence indicating this structure was newly constructed is the existence of weep holes in the mortar joints between the bricks. The original Buildings 1 and 3 do not have these weep holes. Inserted in the weep holes are screen devices, which will allow water drainage and at the same time keep out pests. Photograph 9 shows such a device in one of the mortar joints near the grade line.



Photograph 9. **A weep hole screen device in the mortar joint between bricks.**

INSPECTION

Interior of the Building - Ants



Photograph 10. Ants invading the front exhibit space on the left side when facing the building from the direction of Decatur Street.

It is unknown what these ants may be feeding on. A very simple, non-chemical solution to this invasion is to caulk the base of the wall and the corner openings. Once the renovations have been completed in this area, hopefully all avenues of insect and rodent ingress will be sealed tightly. Currently, a thorough vacuuming of this entire exhibit area is in order.

American Cockroach Infestations



Photograph 11. American cockroach feeding on pipe insulation.

The mechanical/electrical door, shown in Photograph 7, leads into two rooms at the front of the building off the carriage way. An inspection of the room closest to Decatur Street found signs of American cockroaches. They are feeding on the paper insulation of the pipe shown in Photograph 11. In addition, dead cockroaches and egg cases were found in this area. From here, the cockroaches can fan out all over the building following various pipes and conduits from these two rooms up into the upper floors.

In addition to the installation of a bottom brush sweeper on the door to this area, this would be an ideal spot for using pinches of 2% Baygon Cockroach Bait in the corners and along the walls of both of these rooms. A glueboard installation would also be warranted, utilizing the large glueboards, model 60-RBGL, detailed in the Appendices.



Photograph 12. A mature, dead American cockroach.

This is one of the dead American cockroaches found on its back in the two mechanical/electrical rooms at the front of the building. In New Orleans, these cockroaches fly and walk outdoors both day and night. They put all sorts of pressure on buildings in the area. Sealing the building envelope against invasion, both low and high, is critical to insure a pest-free environment on the interior.



Photograph 13. A mature American cockroach with one of its antennae broken.

This photo illustrates what this cockroach looks like when viewed from the top. These cockroaches have powerful mandibles, which can easily damage all sorts of collections. Every effort should be made to prevent these cockroaches from gaining access to the building.



Photograph 14. Two egg cases (oothecae) of an American cockroach.

The American cockroach randomly drops an egg capsule or may glue it to a surface. These egg capsules often ride into a building, having been glued to a cardboard box or artifact. There is a double row of 12-16 eggs in the capsule. The embryos develop within the capsule. In two months, the newly-hatched nymphal cockroaches will force this egg capsule open and emerge. To a lay person, the egg capsule resembles a kidney bean.



Photograph 15. An attar smear from an American cockroach.

American cockroaches produce a brown liquid (attar) from their mouthparts and mark areas where they rest during the day (Photograph 15). Attar has an aggregation pheromone in it, which tells all other cockroaches this area is a safe place to rest during the day. These smears often look like tadpoles or tear drops. The cockroaches "smell" this pheromone with their antennae and will travel some distance to locate a safe resting spot. This one was found on the doorway molding just outside a bathroom where Buildings 2 and 3 join at the hallway. This was one of several markings found on this doorway molding.

For years staff has noticed a pungent odor in the hallway which connects Buildings 2 and 3 on the second floor. At first it was blamed on mold. Then someone thought it may be coming from an accumulation of dead pigeons and their manure in an abandoned building adjacent to Building 3. An investigation of this abandoned building did find a pigeon roost and lots of dead pigeons and manure. The owner of the abandoned building was forced to correct the condition, but the odor persisted.

In fact, the pungent odor in the hallway is coming from a large population of American cockroaches residing in the upper reaches above the false ceiling in the hallway where Buildings 2 and 3 join on the second floor. American cockroaches produce an odorous substance when resting in large numbers. This material, also found in its attar and pelletized droppings, encourages other cockroaches to rest together in groups. It is this strong, pungent odor one encounters when walking in this hallway. It is not from mold or a pigeon infestation.

The American cockroaches in this situation are resting under the roof, as shown in several of the photographs. They are gaining access to this area from outdoors along the roofline where they crawl up the side of the building and under various pieces of flashing. From here they are able to enter the interior. Sometimes they wander down into the hallway and are found in the staff kitchen and hallways. A major effort must be made to first eliminate the interior populations and then to seal off their highways from the exterior.

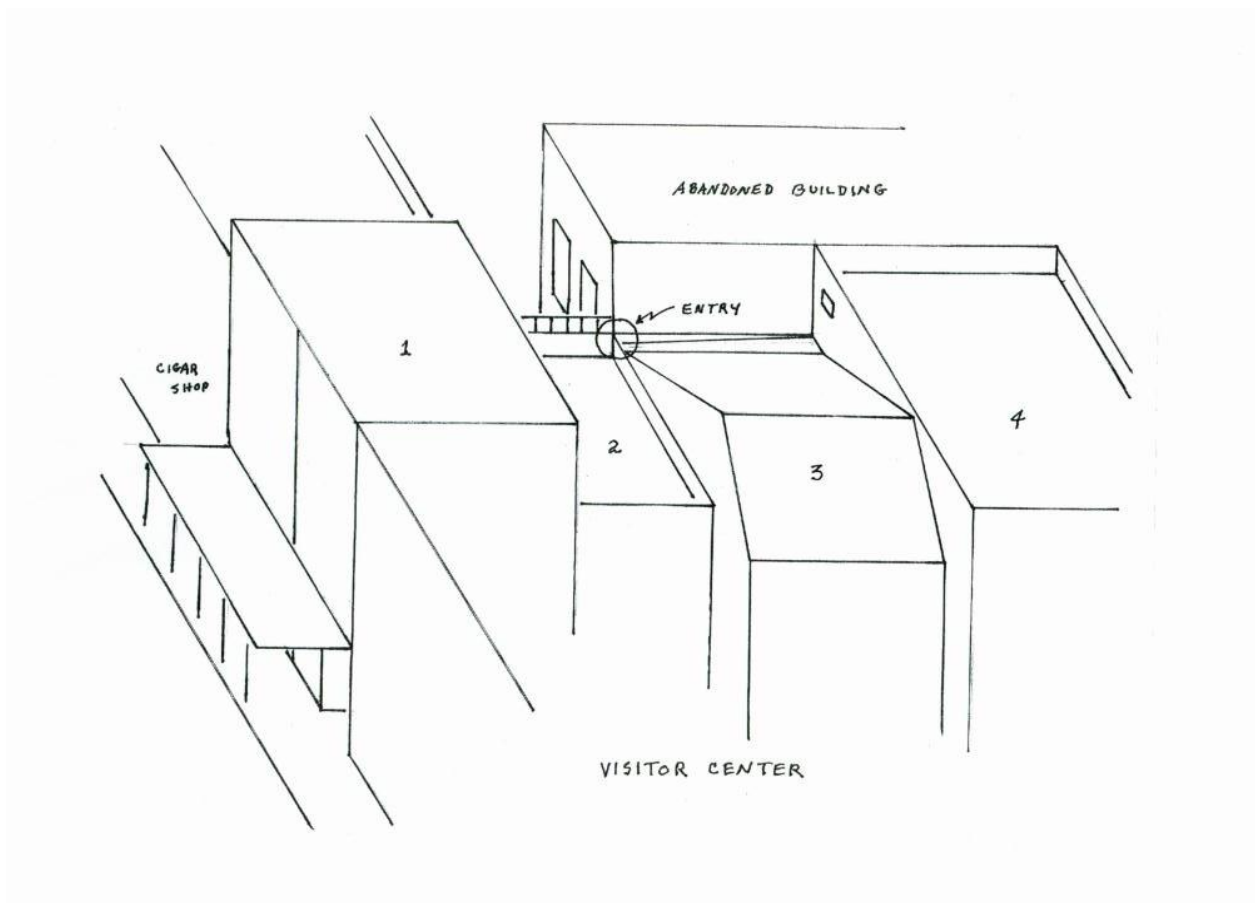
First, on the interior, a number of large glueboards, model 60-RBGL must be placed in the false ceiling of the hallways of Buildings 2 and 3. Some of the glueboards should also be taped to the brick wall in the corner where Buildings 2 and 3 join in order to intercept any cockroaches which may venture down from their resting place into the hallway. Some glueboards may also be strategically placed up on top of the roof joists above the false ceiling.

Second, where feasible, 2% Baygon Cockroach Bait should be placed in the false ceiling and any area on top of the brick wall and roof joists where the cockroaches might find it. This will eliminate some of the cockroaches. When the weather is forecast to be clear, this bait should also be placed on the roof in the area of infestation shown in the photographs and Drawing #1.

Third, once the population has been brought down to manageable numbers, a professional pest management firm should be hired to spray the undersides of the roof and supporting elements with Suspend SC Ultra. This material will kill on contact and give long residual deposits of insecticide to kill the remaining cockroaches. DO NOT allow aerosol

insecticides containing pyrethrins to be used for it will scatter the cockroaches all over the building.

After the initial hoard has been reduced on the interior with the three steps outlined above, the next step is to seal the exterior highways into the building. Various metal flashing on the roof, shown in Drawing #1, should be caulked to prevent ingress. Large glueboards may also be used on the roof to intercept American cockroaches traveling to and from this area. Some may be taped to vertical surfaces, if necessary. It appears the French Quarter Visitor Center has for years acted as a daytime resting magnate for American cockroaches from the neighborhood. We must stop this daily occurrence by preventing the cockroaches from entering the ceiling between Buildings 2 and 3. The following photographs give testament to this regular ritual.



**DRAWING #1. The French Quarter Visitor Center
showing where American cockroaches enter the
underside of the roof of Building 3**



Photograph 16. American cockroach droppings accumulated on a ceiling tile above the hallway between Buildings 2 and 3 on the second floor. American cockroaches excrete a pelletized dropping, which looks similar to a mouse dropping. It can be differentiated from a mouse dropping by its blunt ends and ridges running the length of the dropping. They are usually black in color. Some can be clearly seen in the center left of this photograph, along with debris from the old brick wall.



Photograph 17. Quite a few American cockroaches can be seen in this photo taken above the false ceiling in the hallway of Building 3 at the junction with Building 2. All appear to be adults with full wing covers. This necessarily means they are walking into the building from outdoors. If nymphs were found in this grouping, it would mean this was an in-house population. Adult cockroaches roam the streets and alleys at night looking for food. During the day, they return to this safe resting spot, producing their pungent odor.



Photograph 18. This photo shows the gap between the French Quarter Visitor Center interior brick column and the exterior brick wall. Although it is difficult to see in this photo, there are several American cockroaches resting in this gap. Dark stains can also be seen where the cockroaches routinely venture down from their resting place into the building at night. This infestation has been present for years.



Photograph 19. This photo shows a single American cockroach resting just under the roof. Most of the cockroaches prefer to rest together near their entrance from the exterior. This one was approximately eight feet down the hallway into Building 3. When the populations have been reduced with glueboards and 2% Baygon Cockroach Bait, the professional spraying should insure the underside of the roof and supporting structures along the entire length of the hallway is addressed; not just the area where most of the cockroaches rest during the day.



Photograph 20. This photo shows the abandoned building adjacent to the French Quarter Visitor Center where it abuts the junction between Buildings 2 and 3. The flashing shown in the lower right of the photo is the area where the American cockroaches enter the Visitor Center at the parapet/peaked roof.



Photograph 21. The flashing on the parapet portion of the peaked roof of Building 3 allows the American cockroaches to climb up under the flashing and access the underside of the roof. Aerosol foam caulking or polyurethane caulking can be used to seal these cockroach highways after the populations have been substantially reduced on the interior.



Photograph 22. This photo shows some of the upper and lower flashing at the edge of the building, which allows the American cockroaches to enter the underside of the roof. Neighborhood cockroaches have found this area to be a safe haven during the day.



Photograph 23. I consider this piece of flashing on the corner where the abandoned building meets the wall of Building 3 to be a major highway for the American cockroaches to gain access to the underside of the roof.



Photograph 24. This photo shows the lower flashing, which may also be acting as a highway for the cockroaches into the building. All of this flashing needs to be sealed.



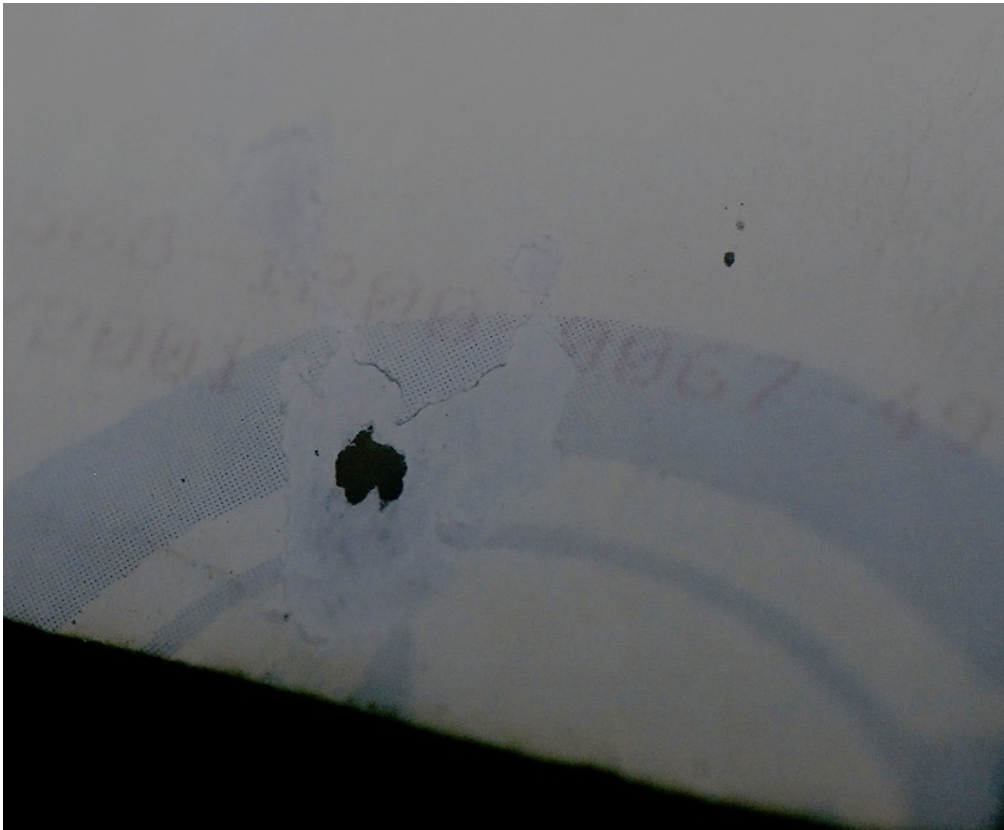
Photograph 25. Once the cockroaches climb up under the flashing, they can easily crawl in the gap behind the flashing and down into the underside of the roof. All flashing on both sides of this parapet/peaked roof must be thoroughly sealed.



Photograph 26. Dead American cockroaches in the standing water of the gutter immediately adjacent to the flashing highways into the building.

Silverfish Infestations

In various areas, especially storage closets and mechanical rooms, silverfish activity and feeding damage were noted. The glueboard program should be intensified in these areas, along with baiting with pinches of 2% Baygon Cockroach Bait applications. Silverfish will feed on this bait and be killed. These infestations do not appear to be threatening the Curatorial Storage area on the second floor.



Photograph 27. Silverfish feeding damage on paper.

Curatorial Storage

Curatorial Storage is located in Building 1 and is comprised of two rooms. There do not appear to be any pest problems in these rooms or in the collections stored in various areas. However, in order to insure pests do not enter these rooms, the two doors leading into Curatorial Storage should be weather-stripped and provided with bottom brush sweepers. In addition, the glueboard program should be intensified in these two rooms.

The Integrated Preventive Pest Management Program for the French Quarter Visitor Center

A member of the Visitor Center staff should chair the IPPM committee. This person should be responsible for installing and maintaining the glueboard program, developing a map of the trap locations, and logging the catches on a monthly basis. All staff members should be made aware of the program and its importance. All sightings of insects and rodents should be reported to the chairperson of this committee and records kept in order to pinpoint areas of infestation and/or ingress. Records of sightings and catches should be maintained in order to identify breaches in the exterior building envelope and address them appropriately. A minimal budget will be necessary for IPPM supplies.

A staff inspection of the exterior of the building should identify any breaches highlighted in this report. These should be addressed following the recommendations given in this report. Copper wool gauze and brush sweepers will minimize pressure from pests on the building and prevent ingress. All exterior doors should be equipped with bottom brush sweepers and proper, tight-fitting weather-stripping.

A thorough housekeeping program for the building is a must. Attention should be paid to vacuuming all areas of this building on at least a semi-annual basis, including corners, quiet areas, hallways, stairwells, and storage areas. Removing clutter is mandatory for eliminating mouse and insect harborage and for setting up an effective glueboard trapping program. The materials stored in this building should be assessed for relevance and much of it discarded.

I cannot over-emphasize the need for an effective glueboard program for this building. Glueboards give lots of information about what is walking around a building, especially at night. Mouse control should utilize large, Model 60-RBGL glueboards and properly-placed, expanded-trigger snap traps or mechanical traps. Provoke® can be used as a mouse attractant for the trigger traps. Mouse control should be aimed at kitchen areas and storage areas. Smaller glueboards can be used for insect monitoring. In public areas, where glueboards in the open would be objectionable, smaller glueboards can be used, hidden from view. If necessary, glueboards can be rolled into tubes and placed in quiet corners. Mice are very curious and will investigate a glueboard tube. This technique is especially attractive to mice if Provoke® is used on the glueboard. The glueboard program aimed at insect control should use Model 150MBGL or 72MB glueboards, with the larger 60-RBGL's for mouse control, positioned flat where possible. Glueboards and the mouse attractant Provoke® can be purchased locally from any pest control supply firm.

The American cockroach infestation should be addressed by preventing them from entering the building, as outlined in this report. A combination sealing the exterior, strategically-placed, large glueboards, 2% Baygon Cockroach Bait, and spraying current harborage areas with Suspend SC Ultra should eliminate infestations and prevent future ones.

Appendices

MUSEUM EXHIBIT AND STORAGE GUIDELINES

Museum management should first develop a definitive museum collection statement to insure collections are on target for the message the museum wishes to present. This collection statement insures the museum will not inherit artifacts from well-meaning benefactors simply because the items are deemed antiques, collectibles, or assumed to be of value. Once this statement has been developed, the registrar or a collections policy committee can decide if a donation is appropriate for the museum.

It is then time for the museum collections policy committee to take inventory of each storage area and decide what goes into the trash, what can be donated to another institution, and what can be auctioned to the public. Especially when it comes to insect and rodent control and prevention, studies have shown clutter is paramount in providing harborage for pests and limiting approaches to pest prevention. To insure collection storage areas are clean and free of clutter takes some effort, but will go a long way towards preventing pest infestation. Keeping collections on shelving up off the floor is important to limit pest access. Any storage area should have at least an 18" clear area around the perimeter in order to allow for pest monitoring. In addition, the following listing will assist in planning the storage and exhibition of artifacts:

1. Never use felt of any type for shelf lining, back drops, exhibits, or for any other reason in a museum. Any felt found in the museum should be discarded. Even "modern-day" felt often contains mixtures of wool and other materials. Felt is highly susceptible to both carpet beetles and clothes moths.

2. For particularly valuable or susceptible materials, place them in a clear polyethylene bag. Condensation problems will not arise as long as the item placed in the bag has been given an opportunity to equilibrate to the conditions of the room. It is helpful to bag things in periods of low humidity during the winter time rather than in the middle of August in humid conditions. Larger items which will not conveniently fit inside a polyethylene bag may be enclosed in 4 or 6 mil clear polyethylene sheeting which has been formed into a "bag." A bag may be constructed by double rolling and stapling the seams with rust-proof staples. Bagging an item will keep it dust and pest free, as long as the bag is tightly sealed.

3. If a large item, such as a horsehair-stuffed susceptible piece of furniture is to be bagged, one may wish to staple insect screening to a pallet, place the item on the pallet, cover it with clear polyethylene and then staple the polyethylene sheeting onto the screened pallet. In this manner, the bottom of the pallet will be open for air circulation, and at the same time insects will not be able to gain access to the piece. None of the fabric pests will chew their way through polyethylene in order to lay eggs on a piece. They are simply taking advantage of susceptible items in the open for egg deposition.

4. If items are stored on open shelving, the shelves should be lined with white Ethafoam or acid-free tissue. Inspection of materials on open shelving will be facilitated; frass drifting from an object will be easily spotted on the Ethafoam or in clear polyethylene bags which house the object. Clear polyethylene bags keep artifacts free of dust and protect against insect egg deposition.

5. Storage of Oriental rugs can be accomplished by rolling them in 4 or 6 mil clear polyethylene sheeting and tying the ends. The seam along the long axis of the carpet can be taped with duct or PCS film tape. In this way, the rugs can safely be stored on a floor. Kraft paper or muslin, if properly sealed, may also be used for rolling and sealing carpets. Fabric pests will not be able to gain access to the susceptible materials and lay eggs on them. Clear polyethylene sheeting is preferred because one can inspect through the covering to determine if any frass is drifting from the woolen carpet.

6. All storage rooms should be thoroughly saturated with glueboards, particularly flanking doorways, along the walls, in quiet corners, and in closets. If a mouse is caught, the entire glueboard should be discarded. For insect control, when large insects are trapped, the glueboard should be discarded to prevent carpet beetles from flying to the glueboard and laying their eggs on the carcasses. Quarterly inspection of the glueboards is normally sufficient for monitoring collections. Proper identification of the pests caught on glueboards will tell the inspector what kinds of pests are being caught, the direction from which they are originating, and whether they are indoor or outdoor pests. If outdoor pests are caught (sow bugs, millipedes, crickets, night-flying moths, wasps) the opening(s) to the exterior must be found and properly sealed to prevent ingress.

7. Acid-free boxes such as Hollinger boxes, containing susceptible material such as woolens, can be protected with synthetic netting, i.e. constructing an organdy bag to house the box. This material which is used for veils of wedding gowns can house an entire box and simply be twist-tied closed.

8. Doors leading to collection storage areas should be sealed tightly with weather stripping and tight-fitting thresholds. If a raised threshold cannot be used, then the bottom of the door should be equipped with a brush sweeper.

9. Routine vacuuming is a must to clean up any insect carcasses which might provide fodder for carpet beetle breeding and also for removing accumulations of hair in the cracks between random width floor boards.

10. Flashlight inspections of exhibits, all items on open shelving, and other susceptible items should be made at least quarterly regardless of the season of the year. Items made of natural animal fibers are particularly susceptible to fabric pest attack. Paper-based materials and photographs are targets for silverfish.

FREEZING

If items are suspected of having infestation or are actually infested, freezing is an effective way to eliminate all stages of insect life. A very thorough literature review and treatise on recommended procedures for freezing artifacts may be found in an article entitled "The Freezing Process -- Effects on Insects and Artifact Materials," by Mary-Lou E. Florian, published in Volume 3 No. 1, fall 1986 of Leather Conservation News. On page 9 of this report, Ms. Florian lists 11 steps specifically outlining the manner in which materials may be frozen as a means of disinfestation.

Generally speaking, materials at room temperature are bagged with the air of the polyethylene bag being partially evacuated using a vacuum cleaner. The bag is then tightly sealed. If there is concern about ice crystal formation on the piece or on the interior of the bag during the freezing process, then absorbent materials such as cotton wool can be placed inside the bag along with the artifact.

The materials are taken from room temperature and immediately placed in a chest-type freezer. A standard chest-type freezer will commonly reach temperatures of minus 15° F., a temperature well below what is required to kill all stages of any museum insect pest. The materials are to be left in the freezer for a period of 72 hours at which time they may be removed from the freezer and allowed to warm to room temperature inside the polyethylene bag. They then should be stored, if possible, in the polyethylene bag. Some individuals choose to vacuum the piece first before putting it through the freezing process; others prefer to do the vacuuming afterwards.

Individuals at the Pacific Regional Conservation Center of the Bishop Museum in Honolulu, Hawaii, in their Conservation Newsletter of the spring of 1989 also give a review of the freezing process. They freeze susceptible materials in a freezer which can hold a temperature of -20° C., which is about equal to about -4° F. They subject the article to freezing for 48 hours, remove it, allow it to warm to room temperature, and then plunge it back into the freezer for another 48 hours. This procedure is particularly suited for wooden objects. I personally have found a double-freezing process is not required if the freezer is capable of cycling between -5° F. and -15° F. I have found a single 72-hour treatment at these temperatures is sufficient to kill all stages of any insects with which we deal in a museum setting.

For freezing large objects or boxes of materials, I have often used facilities at large frozen food storage warehouses. By palletizing and shrink wrapping the load, forklifts can place the materials in a frozen food locker where they may be left for a period of a week or more. I have disinfested books containing infestations of bookworms using this method. Often, someone on a Board of Directors will have a friend in such a business who will gladly allow the museum to disinfest large items at their facility.

When dealing with an active infestation of bookworms in old volumes, it is important the boxed materials be placed on pallets in such a manner as to allow at least two inches of space around each box. Each layer should be staggered in such a way to allow free air circulation around, under, and on top of each box. The boxed materials should be stored at room temperature. The freezer should be at or below 15° F. as the pallet is placed inside. The object is to take the temperature of the materials from room temperature down to 32° F. (0° C.) in no more than 4 hours. If the process is performed correctly, the insects will not be given an opportunity to produce anti-freeze in their systems to ward off the effects of freezing. This is especially important with wood-destroying insects, which are commonly found infesting dead and dying trees in nature. A bookworm, which is a common wood-destroying pest in Europe, is *Anobium punctatum*.

COPPER WOOL GAUZE

The most common copper wool gauze used in the pest management industry, brand named ***STUF-FIT***, is available in 100 ft. and 400 ft. rolls. Each roll is individually boxed for easy handling and storage. Rolls may be purchased individually or by the case. Hundred foot rolls are packed 12 to a case. 400 ft. rolls are packed 5 to a case. The 100 ft. rolls are approximately \$40 and the 400 ft. rolls are about \$100 each. One hundred feet goes a long way. The width to request is approximately 5" wide.

Copper wool gauze is woven in a tube and then folded on a roll in such a way as to enable a person to stuff the end of the roll in his back pocket and climb a ladder to utilize the material without risk of falling. It can quite easily be cut with standard scissors, is easy to handle without gloves, and stays in the crevices where it is stuffed by the spring tension of the copper weaving. It will not rust and can be pushed into openings with a putty knife. Once in place, insects cannot penetrate this material and mice will not chew through it. This material is excellent for vermin-proofing a building as well as for bat exclusion.

Copper wool gauze is available from Allen Special Products, Inc., P.O. Box 605, Montgomeryville, PA 18936, 1-800-848-6805.

The American cockroach - Periplaneta americana (Linn.)

The American cockroach is known by many names including the "palmetto bug" and "water bug." It is the largest of our structure-infesting cockroaches, being 1.5 inches long, reddish brown, with long antennae. In adults, the wings of both sexes are fully developed and extend beyond the tip of the abdomen. In the southern U.S., populations of adults can fly. They often can be seen flying around street lights at night. They invade structures from the roof to grade level and also via the public sewer system.



In northern climates, they seem to have lost the ability to fly, although they can launch themselves into the air from elevated perches and glide to lower levels. Northern populations commonly invade buildings via dry drains, toilets, sinks, showers, and other utilities connected to the public sewer system. Restaurants, bars, hotels, supermarkets, butcher shops, zoos, cruise ships, railroad cars, warehouses, and factories are commonly infested with this species. In warm weather, these cockroaches simply walk or crawl into a structure from alleys and yards. Often they will feed outdoors on pet food in dishes left out for the dog or cat.

The American cockroach is nocturnal, preferring to hide with its comrades during daylight hours. This cockroach is omnivorous with strong mandibles. It has been documented damaging collections materials, including paper, the backing of paintings, postage stamps, starch-based glues, artifacts with blood-based colorants, wallpaper, and book bindings. In addition to its feeding damage, it regurgitates a brown fluid, called attar, onto surfaces. These droplets contain a cockroach aggregation pheromone, which wafts through the air. The cockroaches "smell" this pheromone with their long antennae and travel towards it. American cockroach daytime resting sites often have numerous deposits of attar in and around them. This results in these cockroaches resting in groups during daylight hours. They will be found in boiler rooms, kitchens, inside walls, in the voids of foundations, and other quiet, undisturbed, dark places.

The American cockroach excretes a pelletized dropping or frass. This dropping is usually dark in color, but I have seen green droppings from cockroaches feeding on green-dyed rodent bait. The anti-coagulant toxicant in rodent bait will not affect insects; it is food for these cockroaches and many other insects. The dropping can be distinguished from a mouse dropping by blunt ends and fine ridges running the length of the dropping; it is an extruded pellet. A mouse dropping is tapered and pointed on at least one end and has a relatively smooth surface.

Immature American cockroaches do not have fully-developed wings. The adult female produces an egg capsule from the tip of her abdomen. When the capsule is mature, she will either drop it randomly or glue it to a surface. Glued egg capsules often ride into buildings on boxed deliveries. The egg capsule contains two parallel rows of 12-16 eggs. A female can produce up to 53 egg capsules in her lifetime. To the layman, the egg capsule resembles a dried kidney bean. It takes a couple of months for the embryos to develop inside the capsule. When mature, they force the egg capsule open and emerge as whitish nymphs. They become dark within a few hours after emerging.

Cockroaches grow by feeding and then molting into a larger nymph. Immediately upon emerging as the next stage (instar), they are whitish for a period of time before they "harden up" and become their normal color. This process is analogous to the molting process in the blue crab, where the newly-emerged crab is a "soft-shell crab." The nymphal period lasts up to 425 days before the cockroach finally reaches adulthood. The lifespan of an adult female is 410 days. If you add 425+410 days, that's a total lifespan of a female of almost three years!

The American cockroach is therefore a slow-growing cockroach. The following is a rule of thumb to determine the status of an infestation: if only adult cockroaches are being sighted, they are probably making their way into the building by crawling up through dry drains or from the exterior environs. Cockroaches cannot crawl through the water in a sewer gas trap of an active drain. If nymphs and adults are routinely seen, then there is a resident, breeding population somewhere in the building. A flashlight inspection is in order to find droppings, attar smears, and live insects.

Prevention and Control

The prevention of American cockroaches in a building begins with insuring the building envelope is as tight as possible. Sealing all exterior cracks and crevices, openings around pipe penetrations, and holes in the façade left after removal of a pipe or conduit can be accomplished with copper wool gauze or caulking. Overhead roll and personnel doors should be sealed by installing brush sweepers and proper weather-stripping.

Secondly, an inspection of the facility should identify those drains, which may not be active and therefore have dried out. The drain cover should be lifted and a piece of fiberglass window screen placed over the opening. The cover can then be replaced and the screen trimmed around the perimeter of the cover. In some situations, copper wool gauze can be stuffed into the drain opening.

If a breeding infestation is suspected in a facility, a thorough glueboard program should be installed along walls, in quiet corners, basements, boiler rooms, and storage areas. Glueboards will not only enable an inspector to determine the likely source of the infestations, it will indicate from which direction the cockroaches are traveling. Trapping cockroaches on only one side of a glueboard indicates the cockroaches are coming from that direction. Glueboards will also determine what stages are being trapped.

A glueboard program will not eliminate an infestation, but it will reduce the numbers. To effectively control an infestation, 2% Baygon bait should be broadcast in tiny amounts on the floors along walls, in corners, and quiet areas where the cockroaches have been detected. This bait resembles sawdust and is extremely attractive to large cockroaches. It will kill them overnight. This bait also works well for the control of other types of large cockroaches, including the Oriental, Smoky Brown, Surinam, and Australian cockroach.

Mice

Mice can be and often are a problem in buildings, especially older buildings. They may be cute to some, but routinely damage materials by defecating and urinating on them, not to mention chewing up valuable materials for nesting. In some settings, they may even be a potential health hazard to humans by transmitting the dangerous Hantavirus in their feces and urine. It is therefore mandatory mice be prevented from gaining access to structures.

There are three types of mice, which place pressure on structures and their belongings:

The House Mouse

The common house mouse, ***Mus musculus***, is the most widespread mouse in the world. Its name is derived from a Sanskrit verb meaning "to steal". It commonly lives outdoors where it feeds on small insects, grains, and seeds. It is considered a "nibbler". This species of mouse has a penchant for probing the exterior of buildings at night looking for a way to gain entrance. Mice do not chew their way in; they simply find openings in a building envelope, especially gaps under and on either side of garage doors and foundation pipe penetrations. Indoors they feed on insect carcasses, food left behind by humans, and birdseed brought indoors from bird feeding stations.

This mouse should not be confused with the deer or white-footed mouse, or the meadow mouse (vole), which will be discussed later. The house mouse is 5"-8" long from nose to tail, has moderately large ears and eyes, and long vibrissae (whiskers). The tail is semi-naked and about as long as the body. Its color ranges from light brown to almost black. Field strains are dusky-gray with a lighter belly.

In the fall of the year, after house mouse populations have increased outdoors, mice tend to move to new areas to set up territories. It is at this time, from September until December, house mice probe the perimeter of buildings looking for a small highway into the structure. They will not chew their way into buildings, but rely on openings on the exterior. Often people will make the statement, "Field mice enter buildings in cold weather looking for a place to keep warm." It is true, mice tend to enter buildings in the fall, but they are not "field mice". They are house mice. Field mice are a different kind of mouse, belonging to the genus ***Microtus***, which will be discussed later.

On the interior of a building, a house mouse has a home range of approximately 20-30 feet in diameter. House mice are very curious and will inspect their entire home range many times a night. Every night the mouse follows distinct pathways it has set up in its home range to find food, mate, and care for its young. House mice are prolific breeders, often nesting in communal nests; that is, several females will share the same nest to harbor their accumulated broods. Some nests may have up to 36 young mice in them. Generally a single female will bear a litter ranging from 2 to 13 young. The newborn mice are born pink and naked, with their eyes and ears closed. As with all mammals, they are fed mother's milk. In about 2 weeks they get their fur and their eyes and ears open. By day 21, the young mice are beginning to leave the nest

on short forays, where they begin to eat solid food. A long-lived female can produce 6-10 litters, spaced 30-50 days apart, in a single year.

Mice generally patrol their territory looking for food soon after dusk and just before dawn, although forays may take place throughout the night. Some mice also patrol their territory infrequently during the daytime; sighting mice during the day does not necessarily mean there is a heavy infestation of mice. The number of trips looking for food depends on the availability of food. Some mice have been known to take up to 200 trips per day and night. A mouse consumes one to three grams of food per day. It is typically omnivorous, but prefers plant seeds and dead insects. Mice do not require free water to drink; obtaining what they need in the food they eat. They will drink water, if it is available, but can survive long periods (up to 4 months) without water.

On the interior of buildings, mice are generally part of a group of related individuals. This group is divided into territories containing family and territorial units which are defended by a single male. As they travel, they tend to run along walls, exploring the edges of rooms. Once they have established these highways and feel secure, they will venture farther out into a room. They commonly inhabit false ceilings, where travel is undisturbed. As mice move into new areas, they eventually establish "memory patterns", which enable them to move safely from one place to another, always returning to a place with which they have the greatest familiarity. As they travel, mice tend to urinate in certain areas; the odor of the urine is the main source of maintaining social contact. In heavily-infested false ceilings, repeated urination will stain ceiling tiles.

In any building, mouse control should first be aimed at preventing mice from entering. Copper wool gauze and caulking should be used to fill holes in exterior walls where mice might be allowed to enter. This is particularly important where pipes penetrate walls and for open "weep holes" commonly found in brick facades. Exterior doors should have brush sweepers installed to prevent mouse ingress. Garage roll doors should be inspected for possible entry points and brush sweepers installed. Mechanical traps should flank garage doors in particular.

On the interior, toxic mouse baits should never be used for mouse control. Mouse baits are grain based and often contain insect eggs. The toxicant in the mouse bait is an anti-coagulant and is designed to kill warm-blooded animals. Insects feeding on the baits are unaffected by the toxicants. Not only will mouse baits often generate insects, they may be fed upon by other insects, such as cockroaches and spider beetles. If a mouse consumes mouse bait, it will die in the immediate vicinity, setting the stage for the production of maggots and flies in the carcass. Once the carcass mummifies, carpet beetle and clothes moth larvae will then feed on the carcass. Once they mature, they will fly off to infest other artifacts in a building, which contain animal protein, such as furs, feathers, wool, felt, porcupine quills, taxidermy mounts, dead insects, horn, whale baleen, etc. In a cafeteria or commercial kitchen, baits should not be used because mice have a habit of carrying bait to a cache site, which is often located in a false ceiling. There is a potential for the toxic bait to fall into food preparation areas.

Trapping with snap traps and the use of glueboards should be used on the interior to trap mice. The expanded trigger trap has been shown by studies to be 17% more effective in trapping

mice than the standard trigger trap. By trapping mice, the carcass can be discarded and will not become a source for additional pest problems. There may be staff members who object to the use of glueboards to intercept and trap mice. However, many years of experience have shown populations of mice cannot be controlled by simply using snap traps or glueboards independently. In order to gain control, both methods must be employed together. If staff members insist glueboards not be used, for whatever reason, then live traps can be used in conjunction with snap traps.

There are a variety of "quick-kill" traps on the market today. Most will kill a mouse instantly. Some types of battery-operated traps have electric plates in them, which also work quite well. As has been previously discussed, a house mouse is very curious and will quickly inspect a trap, which has been placed in its territory. This curiosity usually results in a successful trapping. Glueboards are simply placed in the normal mouse highways and trap mice as they make their nightly forays. Rodent repelling devices, which supposedly emit ultrasonic sounds, are not an effective means of controlling mouse populations.

The Deer or White-Footed Mouse

This mouse, ***Peromyscus maniculatus***, is usually found in woodland settings. It is found throughout the United States and normally does not invade structures; being content to live and nest outdoors. On occasion, especially in a setting where a structure is surrounded by woodlands, this mouse will find a way into buildings. This is particularly true with historic houses, log cabins, barns, and outbuildings. It can easily be identified from a house mouse, for it has a chestnut-colored dorsum, and a pure white belly and feet. It also has large eyes and ears.

Deer mice have three to six young per litter, with three to four litters per year. They are nocturnal. Outdoors they primarily feed on seeds. They nest in hollow logs and stumps, beneath fallen logs, and sometimes in shallow burrows, where they build a nest of soft grasses.

This mouse was implicated in 1933 as a reservoir for a type of Hantavirus responsible for an adult respiratory disease, which led to several deaths in the Four Corners area of the southwestern United States. Diagnosis of this disease has been made from throughout the Midwest and West. As of 1966, 127 cases of this disease have been recorded by the CDC. The fatality rate is 50%. Although most cases have occurred west of the Mississippi River, I know of one death in Pennsylvania and one on Long Island. As previously stated, the disease is shed in the urine and feces of mice.

The Meadow or Field Mouse (Vole)

Meadow mice belong to the genus ***Microtus*** and are frequently called voles, meadow voles, and orchard mice. They are vegetarians, preferring to eat succulent grasses. They prefer dense grass cover and only rarely invade structures. They make neat runways in grassy fields, where they live in burrows they have excavated. They line their nest in the burrow with soft grasses. They are poor climbers. If they are found in a building, they will almost always enter lower levels and be found in basements. They may be hitchhikers on bales of hay and therefore may be occasionally found in barns and outbuildings.

This mouse has small eyes, barely-noticeable ears, and a blunt nose. They are only 4 to 5 inches long with a short tail. They are active year round outdoors and provide a food source for snakes, foxes, and birds of prey. They often invade residential planted areas, where they may decimate *Pachysandra* ground covers or girdle young trees. They are notorious in orchards where they girdle young fruit trees. Sometimes they drown in swimming pools. They only rarely enter structures. If meadow mice invade a structure, they will not reproduce indoors; there is nothing for them to eat indoors.

Control outdoors can be successful by placing baits in the runways. These mice patrol the runways routinely. They will readily take a bait. Caution should be used in the outdoor control of meadow mice, because they may become a meal for a bird of prey; dramatically increasing the potential for secondary poisoning of non-target animals. The toxicant in the rodent bait called Talon, which is also the same toxicant found in D-Con mouse bait, is extremely toxic to rodents and birds. It is secondarily toxic to predators and scavengers because the toxin does not break down readily in the carcass of the dead rodent.



House mouse (*Mus musculus*)



Deer and white-footed mice
(*Peromyscus* spp.)



Meadow mice (*Microtus* spp.)

Hantavirus Infection Recommendations for Risk Reduction

Summary

The deadly Hantavirus disease of man associated with rodent droppings and urine is one which can be prevented if certain common sense approaches are followed. One should begin by altering or destroying rodent habitat, cleaning up harborage, and eliminating food supplies around structures inhabited by man. Rodents must be prevented from entering habitable structures by sealing them out. If rodents do manage to penetrate the building envelope, they should be controlled by trapping or with glue boards or a combination of both. Dead rodents should be discarded and carefully handled with gloves. Personal protective measures, such as the use of a respirator equipped with a HEPA filter, and goggles, should be utilized during clean-up of the droppings and contaminated areas. It is recommended rodents on the interior of a structure not be poisoned, for their carcasses will harbor the Hantavirus for a period of time. Eventually the virus will die, the carcass will mummify, and the dried remains will act as fodder for carpet beetles and clothes moths. This should not be allowed to happen in a museum.

Introduction

The recently recognized Hantavirus-associated disease among residents of the southwestern United States and in other areas of the United States and the identification of rodent reservoirs for the virus in the affected areas warrant recommendations to minimize the risk of exposure to rodents. To date there has been at least two deaths in Pennsylvania attributed to Hantavirus infection in sportsmen who were broom-cleaning a mouse-infested hunting cabin. While information is being gathered about the causative virus and its epidemiology, provisional recommendations can be made based on current knowledge of related Hantaviruses.

Rodents are the primary reservoir hosts of recognized Hantaviruses. Each Hantavirus appears to have preferential rodent hosts, but other small mammals can be infected as well. Available data strongly suggest the deer mouse, *Peromyscus maniculatus* is the primary reservoir of this particular Hantavirus. Other wild mice in the desert southwest have also been found to harbor this virus. It is likely the white-footed mouse, *Peromyscus leucopus*, may also eventually be indicted as a harbinger of this type of virus.

Hantaviruses do not cause illness in their reservoir hosts. Infected rodents shed virus in saliva, urine, and feces for many weeks, but the duration and period of maximum infectivity are unknown. Biting may be an important mode of inoculation between rodents themselves. Human infection may occur when infective saliva or excreta are inhaled as aerosols produced directly from the animal. Simply being exposed to a heavily infested room may cause infection via the direct aerosol route. Transmission to humans may also occur when dried materials contaminated by rodent excreta are disturbed, directly introduced into broken skin, introduced into the eyes, or, possibly, ingested in contaminated food or water. Persons have also become infected after being bitten by rodents.

Known Hantavirus infections of humans occur primarily in adults and are associated with domestic, occupational, or leisure activities which bring humans into contact with infected

rodents, usually in a rural setting. Cases have been epidemiologically associated with the following situations:

- planting or harvesting field crops;
- occupying previously vacant cabins or other dwellings;
- cleaning barns and other outbuildings
- disturbing rodent-infested areas while hiking or camping;
- inhabiting dwellings with indoor rodent populations;
- residing in or visiting areas in which the rodent population has exploded.

Hantaviruses have lipid (fat) envelopes which are susceptible to most disinfectants (e.g. dilute bleach solutions, detergents, ethyl alcohol [70%], or most general-purpose household disinfectants [Lysol]. Once being shed by the animal, it has been determined the virus will die naturally within a week to ten days. If rodent populations are eliminated and the areas properly cleaned and sanitized, it should be habitable after this length of time. The best currently-available approach to risk reduction is through environmental hygiene practices which deter rodents from colonizing in the home and work environment.

The Historic House Environment

Paid staff and volunteers in the museum community often work in settings where deer and white-footed mice may venture to colonize structures. Historic house settings are vulnerable to infestation because they are often found in wooded and rural situations, are built on stone foundations, have very “loose” building envelopes, are understaffed, and pay little attention to occasional furry visitors. These mice often have free reign of basements, crawl spaces, attics, closets, woodpiles, and various outbuildings, where they leave their droppings and urine at will. It is not uncommon to find storage areas in such settings with large accumulations of mouse droppings and urine stains. Although the risk is slight (the virus dies in a week to ten days), risk of Hantavirus infection in such natural settings should be taken into consideration.

Deer and White-footed Mice

The deer mouse is found in and around residences and other man-made structures from forested areas to grasslands. This species of mouse is the most widely distributed and abundant mammal in North America. It is found throughout most of North America, extending into Alaska to the northwest, Newfoundland to the northeast and south all the way to the Yucatan Peninsula. The white-footed mouse is difficult to distinguish from the deer mouse by coloration alone. It is normally found in more wooded or brushy areas and is commonly found in woodland settings as well as heavily landscaped residential areas. It ranges throughout the United States east of the Rocky Mountains except for parts of the Southeast.

The deer mouse is a “pretty” mouse with a reddish-brown top coat, white belly, and white feet. There is a distinct separation between the rusty, upper color and white belly. Even the tail is bicolored. This mouse has large eyes, big ears and long whiskers. Deer and white-footed mice are often pictured as busying themselves in a cabin setting with a fireplace in the background as the occupants variously read and knit in rocking chairs by a roaring fire.

Deer and white-footed mice are primarily seed eaters, feeding on seeds, nuts, acorns, dried corn, and birdseed. They also consume insects and insect larvae, fungi, and fruit. They will often “squirrel away” seeds and nuts in the fall of the year. They are nocturnal with a home

range of 1/3 to 4 acres. Populations in the summer months may reach 15 mice/acre. Mice do not need free water to drink. If we provide them with a bird feeder just outside an historic house or bird sanctuary and combine this with easy access to the building for nesting purposes, we have unwittingly set the stage for an infestation.

Outdoors, these mice make a nest of twigs, leaves, and soft, shredded grass usually located in cavities of tree stumps or beneath the ground in cavities of tree roots. They will often nest inside homes, sheds and barns, particularly abandoned buildings or in parts of a building not frequented by humans. They raise from 1 to 8 young. The young reach maturity in 7 to 8 weeks, allowing those born in the spring and summer to breed the same year. They do not hibernate in the winter. They often become food for foxes, raccoons, skunks, hawks, and owls.

General Recommendations

It is quite obvious prevention and elimination of mouse infestations inside a structure is the key to a successful risk management program. Some of the following steps should be instituted:

- Keep food, including pet food and birdseed, in rodent-proof containers.
- Routinely clean up bird seed deposits around feeders.
- Maintain a trash and clutter-free environment outdoors within 100' of the structure and in basements, crawl spaces, attics, closets, and outbuildings.
- Rodent-proof the building by filling exterior openings with copper wool gauze, caulking, mortar, or aerosol expanding foam.
- Use covered, baited snap traps, repeating mechanical traps, or protected baited live traps on the exterior along foundation perimeters to intercept rodents.
- On the interior, utilize baited snap traps, mechanical traps, and/or glueboards to trap rodents. Handle the rodents and traps carefully with gloves.
- Do Not Use Poisons. A mouse carcass beneath the flooring or in a wall will harbor the Hantavirus for a fairly long period of time. Once the carcass mummifies, it will support all sorts of fabric pests, which may later move into collections in storage and on exhibit.

Clean-Up of Rodent-Contaminated Areas

Areas of rodent activity can be identified by accumulations of fecal pellets and urine stains. Not only will these be found in quiet corners, closets and other floor level areas, but they are also commonly found in false ceilings. Not as easily discernible are those highways mice make while traveling throughout the building. These highways are found by searching for trails of darkened stains beneath doors, along and on top of baseboards and other moldings, around corners, alongside ductwork, on sills, and up the corners of stone or block foundation walls. In

actuality, these darkened pathways are made when mice continually drag their behinds across the surface on which they are running. The pathways become darkened from fecal smears and body oils. Other signs of mice may be remnants of seeds, nuts and corn kernels. Wild cherry pits are a favorite of native mice.

Clean-up of rodent-contaminated areas should begin with personal protective measures. The individual should wear rubber gloves and a respirator equipped with a HEPA filter. These inexpensive respirators are available through safety equipment or carpet cleaning supply houses. Once the individual is fully protected, the following steps should then be followed:

- Spray dead rodents, nests, droppings, urine, trails, and other tainted areas or items with a general-purpose household disinfectant, such as diluted Lysol or household bleach. Soak the material thoroughly and then scrap it up with a spackling knife and place it in a plastic bag. When the clean-up is complete, seal the bag and place it in a second, sealed plastic bag. Dispose of the bagged material by burying it in a 2'-3' deep hole or by burning it.
- After the above items have been removed, mop the floors with a solution of detergent, disinfectant, and water. Spray dirt floors with a disinfectant solution. A second mopping is optional. Carpets can be disinfected by spraying with household disinfectants or by commercial-grade hot water extraction or steam cleaning or shampooing. To avoid potentially infectious aerosols, do not vacuum or sweep dry surfaces before mopping.
- Disinfect countertops, cabinets, drawers, and other durable surfaces by washing them with a similar combination solution.
- Rugs and upholstered furniture should be steam cleaned or shampooed. If rodents have nested inside the furniture, it should be removed and burned. If the furniture is a valuable antique, if possible, the nest may be removed, and the item stored for a period of time to insure the virus, if any, has died.
- Launder potentially contaminated bedding and clothing with hot water and detergent. Machine-dry on a hot setting or air dry in the sun.
- The nature of the artifacts or materials which require decontamination may occasionally dictate measures other than wet sanitizing by spraying, mopping, or wiping. Some situations may require both wet and dry measures. In the few situations where dry decontamination procedures are to be utilized, an industrial vacuum cleaner equipped with HEPA filtration is mandatory for the clean-up. Professionals may be contracted to do this type of work. Insure they are fully familiar with the inherent danger and have the equipment and training to properly carry it out.

It is to be reiterated the threat of human exposure to and infection by live Hantavirus from rodents, primarily wild mice, is slight in most areas of the country. The control and prevention measures reviewed in this appendix will reduce the likelihood of human exposure to Hantavirus-infected rodents in areas where outbreaks are known to have occurred. A more detailed set of recommendations may be found in a 1993 report prepared by the Centers for

Disease Control and Prevention entitled, *Hantavirus Infection - Southwestern United States: Interim Recommendations for Risk Reduction*. This pamphlet is available by calling the Hantavirus Section of the CDC in Atlanta, Georgia at (404) 639-3311. It may also be purchased through the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402-9325, (202) 783-3238.

MOUSE CONTROL

In some situations, it is undesirable to use glueboards as a means for controlling mice. Often people become very squeamish when they see a mouse struggling on a glueboard. If mice must be controlled, they would much prefer to have it killed immediately. Once again, it is reiterated rodent bait should never be used indoors. What is desired is to trap the rodents and remove them totally from the premises. If a mouse is allowed to die inside the structure, its carcass will mummify and then generate large populations of insects, especially fabric pests.

If traps are to be used for mouse control, the best type of snap trap to use is one with an expanded trigger. Expanded trigger traps have very large plastic triggers which significantly increase the probability of trap success. The Victor brand of mouse traps, which are manufactured by The Woodstream Corporation in Lititz, Pennsylvania, are available as The Professional Mouse Trap, Model M-7. This mouse trap has a large yellow expanded trigger which will catch mice not only because of bait placed on the trigger of the trap, but also simply by the mouse stepping on the corner of the trigger. The mouse trap trigger should be placed towards the wall with the trap itself perpendicular to the route of travel. Traps should be placed in quiet corners, closets, basements, on top of the sill plate, and in false ceilings and attics. If the trap is placed perpendicular to the wall, a mouse traveling in either direction down the wall has an equal chance of being trapped.

If bait is to be used on the trap, it is recommended a small portion of a cotton ball be smeared in peanut butter or Provoke® and this combination be attached to the trigger of the trap. Provoke® is a gel-type mouse attractant manufactured by Bell Laboratories. The mouse is not only attracted to the trap because of the odor from the peanut butter or Provoke®, but also because the small amount of cotton ball is recognized as a favorable nesting material. Once the mouse attempts to take the cotton ball off the trap, it is quickly killed. If peanut butter or Provoke® alone are used as bait, often mice will steal the peanut butter or Provoke® without setting off the trap. However, if the combination of attractant and cotton ball is used, the mice generally will not steal the bait.

The Professional Expanded Trigger Trap, Model M-7, is available in case quantities of 72 from a supplier of equipment and chemicals to the pest control industry. If glueboards are to be used in combination with snap traps, the most preferred are those manufactured by Atlantic Paste and Glue Company of Brooklyn, NY. By referring to the Yellow Pages of the local telephone book, at the end of the section for pest control operators, the firms which sell equipment and supplies to this industry will be listed. These traps and/or glueboards can be purchased directly from your local pest control supply house.

MOUSE/INSECT CONTROL -- GLUEBOARD PROGRAM

Commercially made glueboards should be installed indoors in order to intercept incoming insects and rodents. Glueboards should be placed along walls, in quiet corners, flanking doorways, in closets, the perimeters of mechanical rooms, quiet dark corridors, pipe chases, false ceilings, attics, and other areas where insects and rodents travel and hide. Key areas of the building would be in mechanical areas, storage areas, vaults, and in basements and attics. No restrictions should be placed on the number of glueboards personnel want to place in a building.

Insects and rodents running along walls or residing in quiet areas will be mired on the glue and can then be discarded. Individuals responsible for respective areas should discard glueboards with accumulations of insects or rodents. Carpet beetles can infest carcasses right on the glueboards. I have seen several situations where insect and/or rodent carcasses have been fed upon and carpet beetles have completed their life cycle to fly off the glueboards without becoming mired in the glue. Unless insect and rodent pressure is intense, inspections of glueboards can be made on a quarterly basis.

Never use rodent baits inside a building. Rodent baits are often infested with various insect eggs. Once insects consume the rodent bait, they will fly off to lay eggs on susceptible materials. Another reason rodent baits should not be used; we do not want mice dying in some wall or floor void. Once the carcass mummifies, fabric pests will clean up the fur and other protein portions of the carcass. Once a population builds up in the carcass, they will fly off to lay eggs on other susceptible items. Finally, in a kitchen or dining area, mice may hoard the bait in false ceilings, with the potential of this toxic material falling into food. The only means of rodent control on the interior of a building should be with glueboards, snap traps baited with peanut butter or mechanical multiple catch traps.

The most effective glueboards on the market today are made by Atlantic Paste and Glue Corporation of Brooklyn, New York. They are extremely effective because of the type of glue used, the insect and rodent attractants, and the fact they sit flat on the floor. Four basic designs can be utilized in a glueboard program.

The CatchMaster Gluee Louee Model 60RBGL is a large glueboard used for rodent control primarily in basements, attics, and false ceilings. It is usually not folded tent-like but placed flat on the floor along walls or in false ceilings. The larger size and thicker amount of glue make it excellent for catching mice. A trick for maximizing trapping success is to place a few sunflower seeds around the glueboard with 2 or 3 in the center of the glueboard. Mice love sunflower seeds and will readily venture onto the glueboard, once they have finished eating the few sunflower seeds surrounding the glueboard.

Another successful technique for increasing mouse catch totals is to use a powerful attractant in the rear, center of the glueboard. Bell Laboratories distributes a gel mouse attractant called Provoke®. A small dab of this powerful material on a model 60-RBGL glueboard is enough to encourage mice to venture far onto this glueboard. The glue of this particular trap is very thick; a mouse will not be able to escape from this glueboard.

The CatchMaster Insect Trap and Monitor Model #100-1 is a small insect trap which is folded in a tent-like fashion. It can be divided into three small individual traps by separating the glueboard at perforated lines. This insect trap is excellent for catching crawling insects, spiders, carpet beetles and particularly webbing clothes moths. The glue in the trap seems to be an attractant for webbing clothes moths. This glueboard can also be used in cockroach and other insect monitoring programs.

The CatchMaster Gluee Louee Economic Mouse and Insect Glue Trap Model #150MBGL is a small glue trap made to be folded into a tent or laid out flat on the floor. Its small size makes it ideal for tucking into tight areas. Although it is advertised as a mouse glue trap, the glue layer is fairly thin and mice often escape after being mired in it. The model 60RBGL is preferred for mouse control. The CatchMaster Roach and Insect Monitor, Model #150RI is a small glueboard which is folded into a shallow box with open ends. The glueboard itself has a wood grain finish and sits very low to the floor. This would be a good choice as an insect monitor in areas where the public may see the trap.

When sampling for small insects, the Trapper Monitor and Insect Trap from Bell Laboratories, Inc. is also an excellent choice. This type of glueboard is manufactured by Bell Laboratories, Inc., 3699 Kinsman Boulevard, Madison, WI 53704, (608)241-0202. These traps can be purchased inexpensively in bulk from any pest control supply house which may be found in the Yellow Pages at the end of the Exterminator or Pest Control section.

Some museums and public institutions may want to hide or secure a glueboard so visitors do not tamper with them. Some simply do not want to see a mouse trapped on a glueboard. In dioramas, the administrators of the IPPM program may not want individual glueboards in the open; but would rather they be camouflaged in some way.

The following examples give some ways to accomplish this approach:

Rodent Rock Café – This "stone compartment" is available in three separate colors and works well for rats, mice, carpet beetles, clothes moths, and occasional invaders. It is available from Wildlife Control Supplies and other vendors. By cutting out the interior bait holder, a full-size glueboard or pheromone trap can be placed inside this unit. They can be secured to floors with double-sided tape.

Landscape Rock – this enclosure from Bell Laboratories, Inc. is similar, but has to be substantially modified in order to fit a glueboard inside the unit. It is designed to hold four bait blocks of rodenticide.

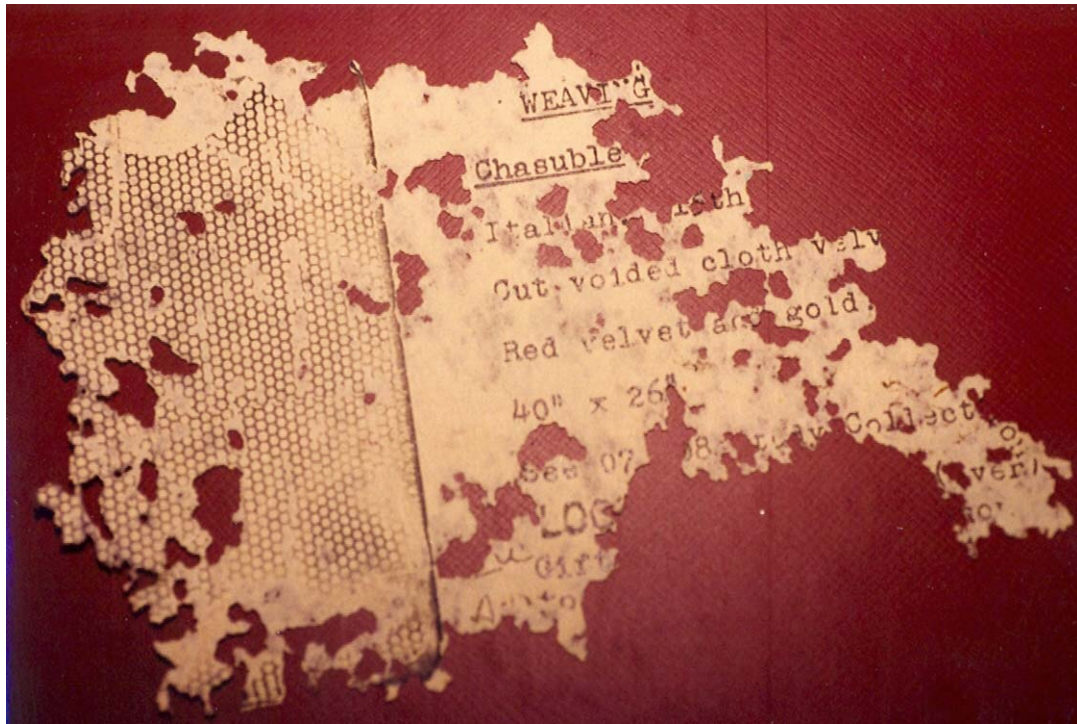
Standard Metal Box – The final enclosure for a glueboard or pheromone trap is manufactured by the J.T. Eaton Company. It is a basic metal box with a hinged lid. The openings in the top and the two ends would allow a pheromone glue trap to work well, if placed inside. This is a more utilitarian approach and would be used where there is heavy public traffic close by. If desired, it can be affixed to a floor with double-sided tape.

Silverfish

Silverfish is the name given to a group of primitive, wingless insects, in the order Thysanura, some members of which have their bodies clothed in silvery scales. They have a distinct, carrot-shaped body with long, segmented antennae and three, long tail-like appendages arising from the tip of the abdomen. They have chewing mouthparts and tend to sit on the surface and rasp their way through the substrate. Often they will simply abrade the surface resulting in feeding damage, which looks "lacey" and irregular. They will often select certain areas of a printed surface, leaving other areas untouched.



The common silverfish, *Lepisma saccharina* L., feeds in cool, moist conditions on materials containing carbohydrates and protein. It feeds on paper products, wallpaper, glue, paste, insulation paper backing, blown-in, cellulosic insulation, dead insects, and rarely fabrics. If fabrics are fed upon, this silverfish is usually eating the starch or sizing and only rarely eats holes in fabrics. Silk cloth can be damaged from this silverfish feeding on the sizing. I've seen only two examples of silverfish feeding on fabrics: one was a situation where they ate holes in a finely-woven cotton fabric in an attic, having been attracted to the starch. The other was damage to a mounted silk portrait, where they were feeding on the sizing.



Silverfish are nocturnal; hiding in cracks and crevices during the daytime. At night, they roam widely until they find a suitable food source. Once found, they tend to hide in the immediate vicinity during the day. They will then continue to feed on the same food source until it is depleted. Wallpaper will often be eaten, along with the starch paste used to adhere it to the wall. Certain dyes will be left alone, while other areas will be decimated. I've witnessed several situations where silverfish hide in the crevices of a chair rail or window frame during the day, coming out at night to feed on the wallpaper and paste. They can be very damaging to maps, blueprints, prints, book labels, artifact labels, and other valuable collection artifacts. I've seen one situation where silverfish ate the typed printing off all the artifact labels in a museum vault.

Silverfish mature through a process known as ametabolous ("no") metamorphosis. The newly-hatched silverfish nymphs look like tiny adults without scales. After the third molt, scales are present. Unlike more advanced insects, which stop molting once reaching adulthood, silverfish continue to molt throughout their life span. They may shed their exoskeleton 60 times during a period of two to three years. Sexual maturity may be reached in two to three months or as long as two or three years after hatching.

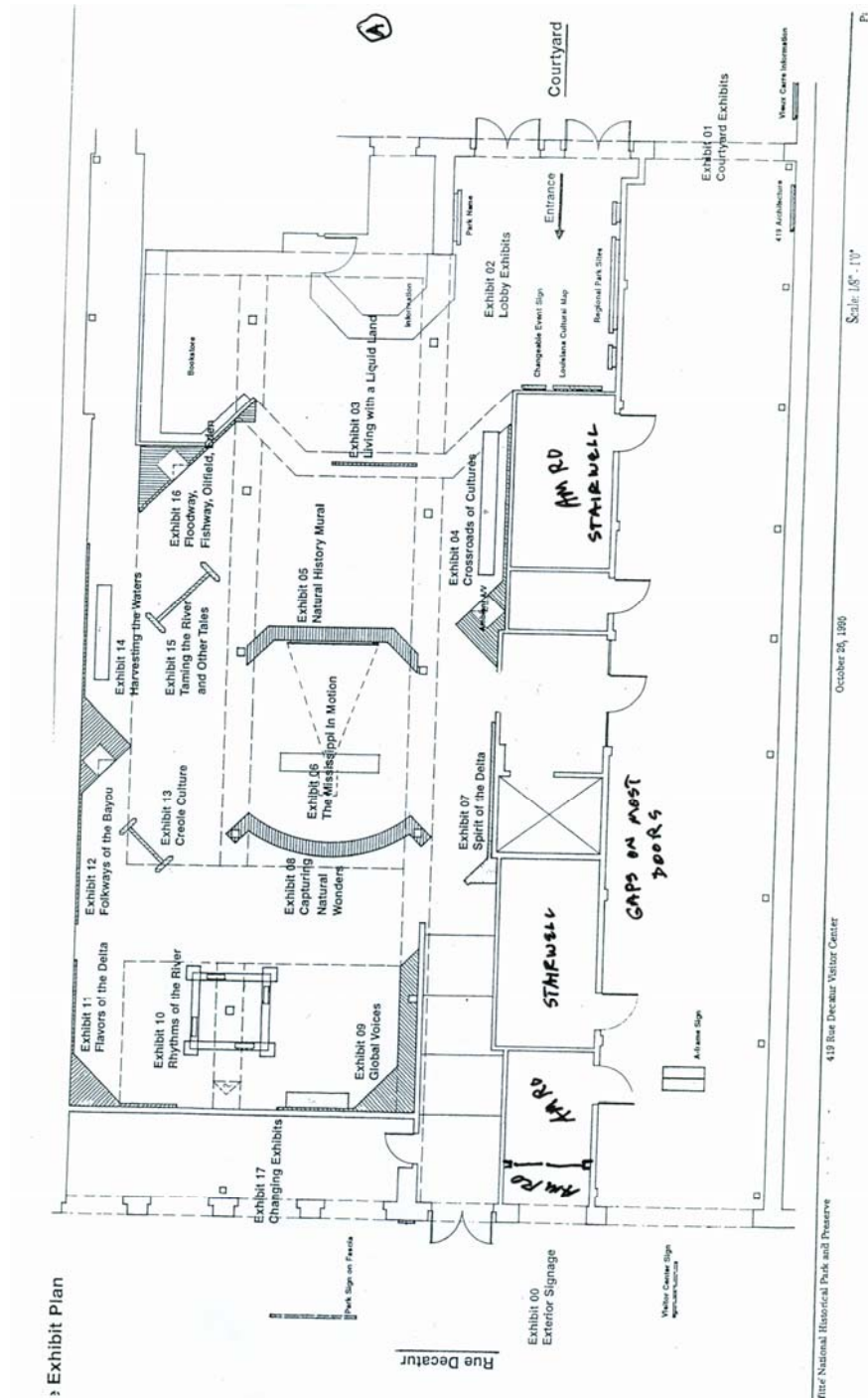
In a building, silverfish tend to migrate vertically from the attic to the basement or crawlspace, depending on the season of year. In the hot summer, silverfish will be forced out of the attic and down into the lower floors. In the cooler months of the year, they will once again make their way up into attic areas. In the attic, food is plentiful, such as dead insects on the floor and in the insulation and paper products in storage.

The use of a thorough glueboard program may reduce the numbers of silverfish, if the glueboards are used properly. In order to trap silverfish on a glueboard, a penny should be placed in the glue on all four corners, with one in the center of the glue. The flat glueboard is

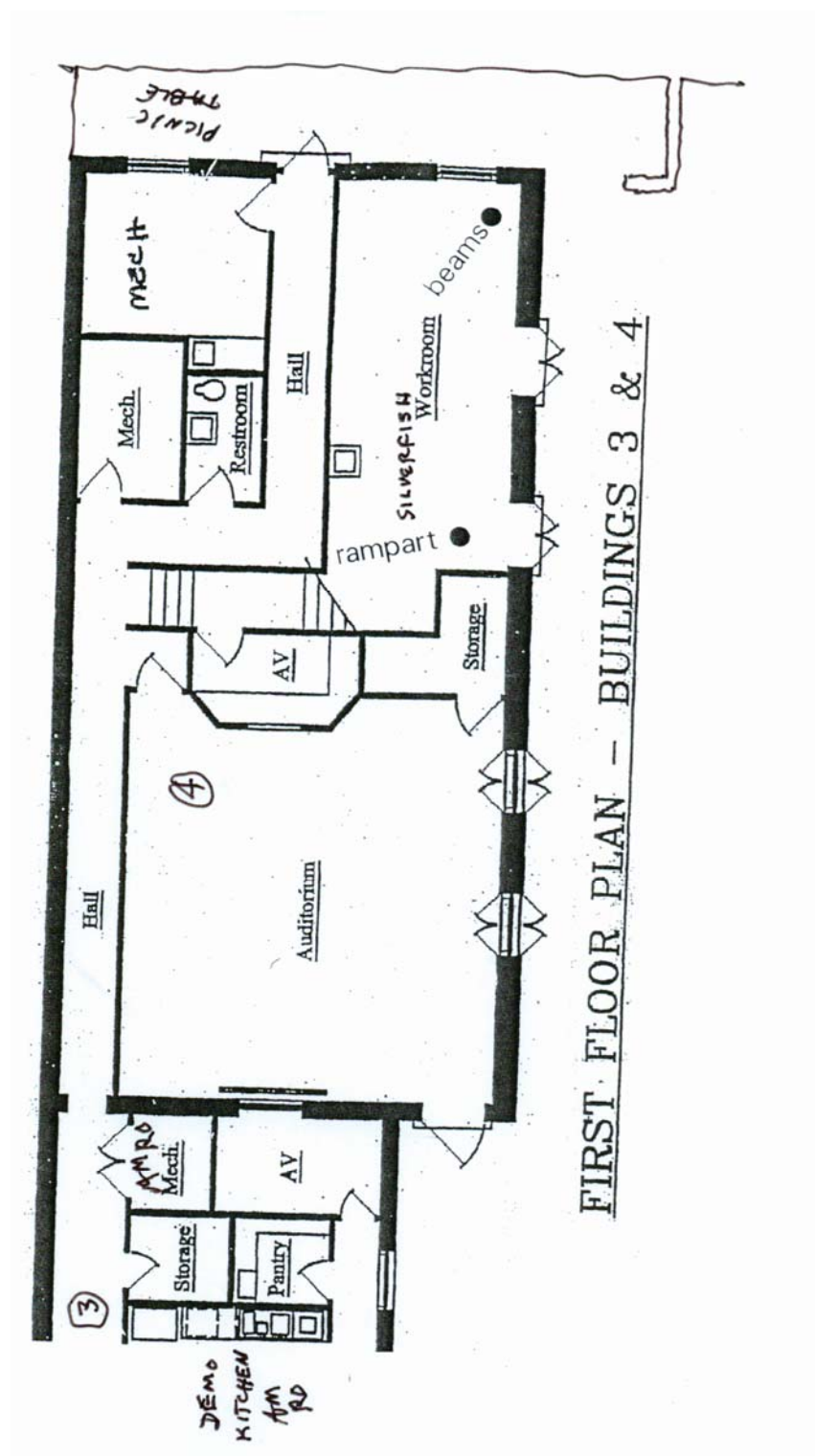
then turned upside-down, with the glue facing the floor. Silverfish will seek out this shallow void beneath the penny-raised glueboard and become mired in the glue. If a flat, cardboard glueboard is placed with the glue facing upwards, the silverfish will squeeze under the glueboard for daytime resting. They will then eat the printing off the back of the glueboard.

If silverfish are plentiful, perimeter spraying of rooms with an encapsulated, residual insecticide on a quarterly basis can be effective. Encapsulated insecticides give long-term control of crawling insects. Attention should be paid to water and sewer pipe chases, sinks, kitchens, and bathrooms.

In addition to a residual spraying program, a desiccant dust can be blown into wall voids and pipe chases for control. Silica gel combined with pyrethrins, such as Drione®, would be an excellent choice for this type of application. Beneath cabinet ranges, ¼" holes can be drilled along the base of the kick plate and dust can then be blown into the void beneath the raised cabinetry. As long as it does not become wet, Drione® will act as a desiccant for months or years in these voids. It is very effective against most crawling insects, including carpet beetle larvae.

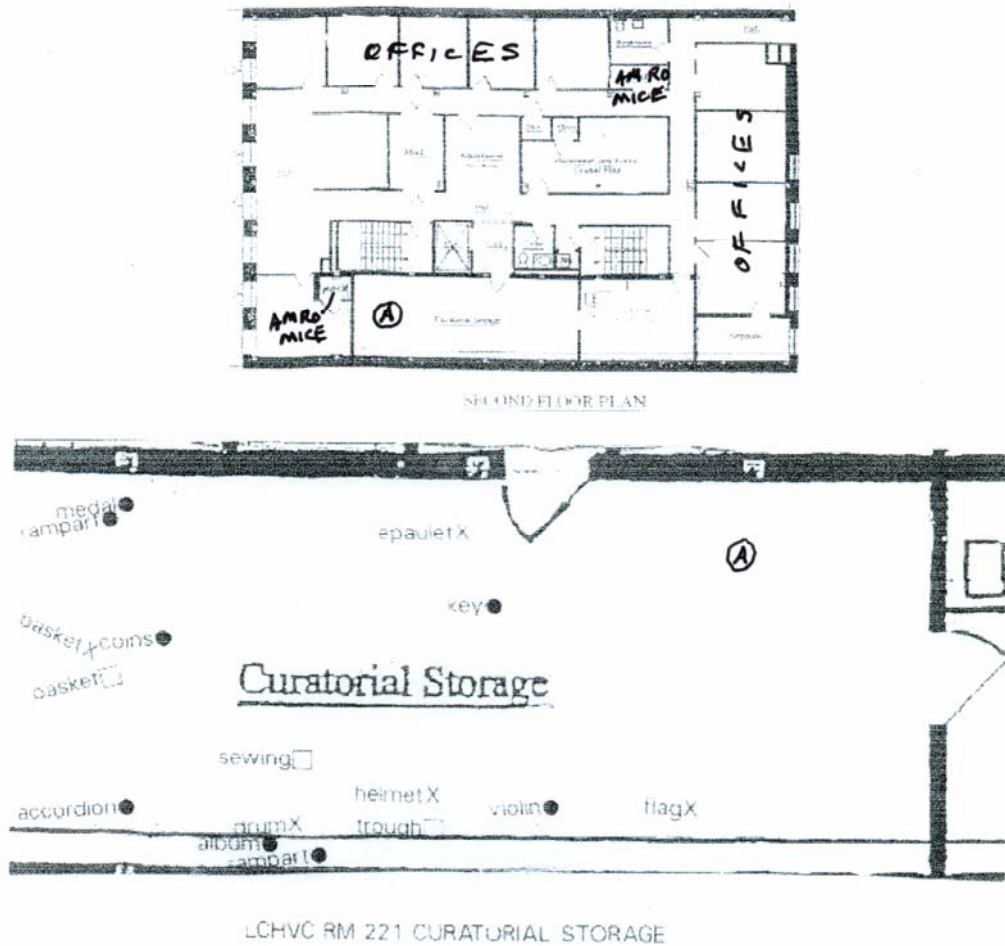


Building 1 First Floor showing American cockroach locations and gaps under various doors along the carriage way.

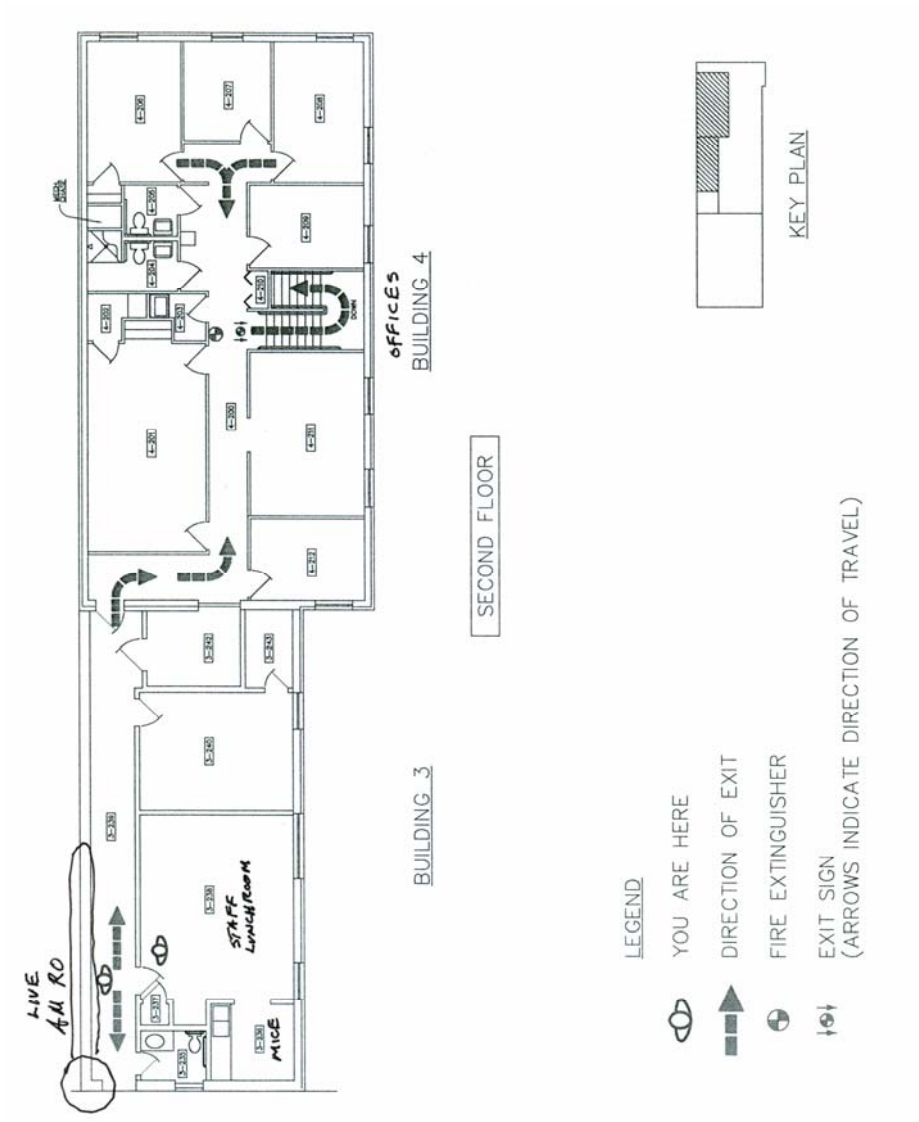


Buildings 3 & 4 partial plan of first floor demonstration kitchen, auditorium, and maintenance areas. Note the location of a silverfish infestation.

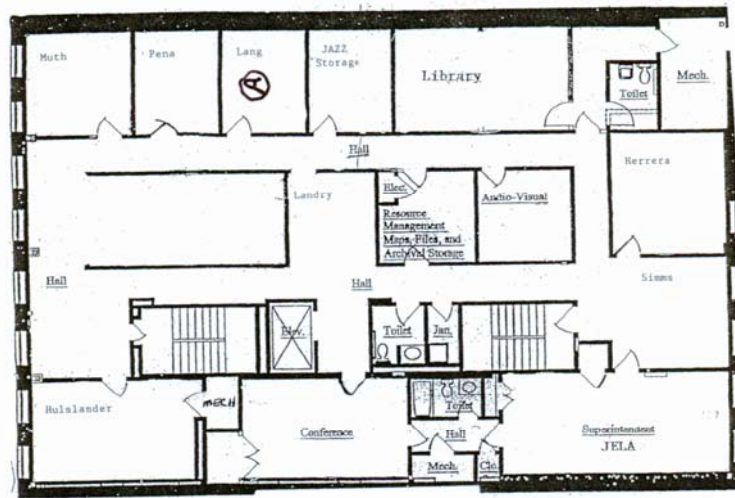
LCHVC Rm 221 (Artifact Storage)



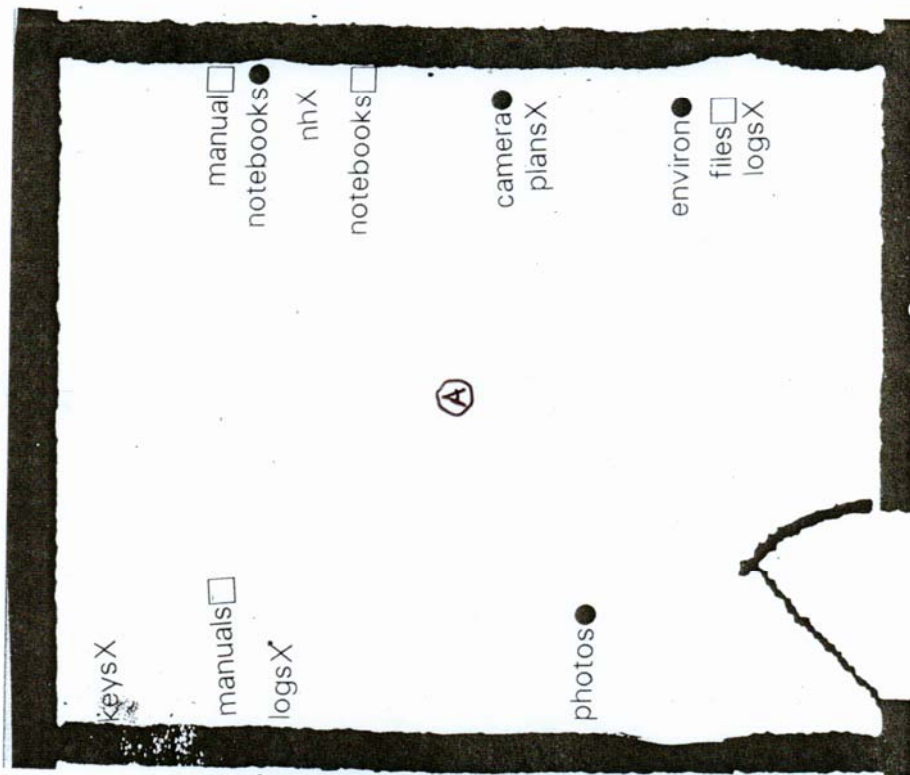
Building 1 second floor showing offices and Curatorial Storage.



Buildings 3 and 4 second floor showing the location of the American cockroach infestations above the false ceiling and under the roof.



THIRD FLOOR PLAN



Building 1 third floor.

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E-Spike and the Pigeon Spike Models are for pigeons and seagulls only.
For small birds or for heavy bird infestations, use the **Nixalite Premium Bird Barrier Spikes** for total control.

Bird Spike Comparison Table - Use to quickly compare Nixalite's bird control spikes



Nixalite Premium Bird Barrier Spikes

Premium Nixalite Bird Barrier Spike model descriptions, applications and options.
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E-Spike is the most affordable, all stainless steel economy bird spike ever made for pigeons and seagulls. **Order E-Spike Models here.**



Pigeon Spike Composite

An affordable combination of stainless wires and a flexible, UV stabilized plastic base. Installs quickly on all types of surfaces. **Order Pigeon Spike Composite here.**

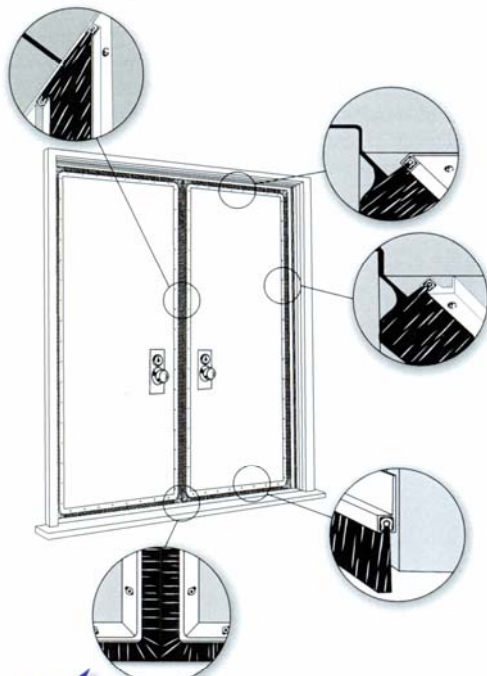


Pigeon Spike Plastic

The lowest cost deterrent for pigeons and seagulls available. This all UV stabilized clear plastic spike installs quickly. **Order Pigeon Spike Plastic here.**

Sealeze AstraSweep™

... seals the gap between the door sweep and astragal seals on double metal or wood doors.



NEW!

AstraSweeps

Sealeze brush weather seals are easy to install.
No special tools are needed!

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AstraSweeps installed with Sealeze Door Sweeps and Astragal Seals:

- Save energy and keep out unwanted pests
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- Need less maintenance – provides durability unmatched by vinyl seals

Sealeze AstraSweep and Door Sweep Brush Weatherseals are ideal for sealing the irregular surfaces of thresholds at door bottoms, conforming to the surface without impairing door movement. All Sealeze brush door seals are made with durable Sealeze nylon Therm-L-Brush® for long, long life. Rugged anodized aluminum holders are available in clear (silver color), duranodic (brown color) and polished brass (gold color) finishes – a perfect color match and complement to our door sweep and astragal seal holders. Holders are pre-slotted for easy installation.

AstraSweeps are for use with Sealeze Door Sweeps and Astragal Seals with product code beginning with: C380.

Call for quantity discounts and factory-direct dealer prices.

For more information call:

1-800-446-7325

E-mail: weatherseal@sealeze.com

Made in USA



BAYGON® 2% Bait

INSECTICIDE

Specimen Label

For Pest Control Operators and Commercial Use Only.

* *For effective control of cockroaches, crickets, and ants.*

ACTIVE INGREDIENT:

Propoxur, 2-(1-Methylethoxy)phenol methylcarbamate 2%

INERT INGREDIENTS: 98%

Total: 100%

EPA Reg. No. 432-1283

EPA Est. No.

**STOP - Read the label before use.
Keep out of reach of children.**

CAUTION

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION: Harmful if swallowed or absorbed through skin or inhaled. Causes moderate eye irritation. Avoid contact with eyes, skin or clothing. Avoid breathing dust.

Personal Protective Equipment:

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Chemical-resistant gloves made of any waterproof material.
- Shoes plus socks

Follow manufacturer's instructions for cleaning/ maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry

User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

SYMPTOMS OF POISONING: A sense of "tightness" in the chest. Sweating. Contracted pupils. Stomach pains. Vomiting and diarrhea.

TOTAL NET CONTENTS:

BACKED
by **BAYER™**

FIRST AID	
Contains an N-Methyl carbamate that inhibits cholinesterase	
If swallowed	• Call a poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by a poison control center or doctor. • Do not give anything by mouth to an unconscious person.
If on skin or clothing	• Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15 to 20 minutes. • Call a poison control center or doctor for treatment advice.
If inhaled	• Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. • Call a poison control center or doctor for further treatment advice.
If in eyes	• Hold eye open and rinse slowly and gently with water for 15 to 20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
In case of emergency call toll free the Bayer Environmental Science Emergency Response Telephone No. 1-800-334-7577. Have a product container or label with you when calling a poison control center or doctor, or going for treatment.	
Note To Physician: ANTIDOTE - Administer atropine sulfate in large therapeutic doses. Repeat as necessary to the point of tolerance.	

ENVIRONMENTAL HAZARDS

This product is toxic to wildlife and aquatic invertebrates. Birds and other small mammals feeding on treated bait may be killed. Do not apply directly to water. Do not apply where runoff is likely to occur. Do not contaminate water by cleaning of equipment or disposal of wastes. Apply this product only as specified on this label.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Do not formulate this product into other end use products.

BAYGON® 2% Bait insecticide, a ready-to-use product, is very effective for the control of ants (except California), crickets and the following cockroaches listed below. It gives rapid kill of these insects including those resistant to certain chlorinated hydrocarbon and phosphate insecticides. Crickets and roaches die quickly after feeding on the bait. Apply as needed to control the target pests.

Cockroaches: American, Brown, Brown banded, German, and Oriental roaches.

Crickets

Ants (including carpenter ants) (except California)

For use in Homes, Apartment Buildings, Stores, Restaurants (non-food areas), Warehouses, Government Offices, Public Buildings and Institutions.

Apply bait lightly to floors near baseboards, in closets, under sinks and refrigerators, around and inside garbage cans, and in other areas where insects are found but which are inaccessible to children such as cracks and crevices. (Do not make crack and crevice applications in California.) Do not apply to animals. Do not treat portions of buildings where animals can feed on bait. Use approximately 4 ounces of bait per 1,000 sq. ft. of space and scatter lightly so that bait is barely visible. Repeat as necessary. Keep out of reach of children.

For Use By Pest Control Operators in Restaurants (food areas), Poultry Packing, Red Meat Packing and Food Processing Plants, including plants that are Federally Inspected, as well as food processing areas of stores, warehouses, Government Offices, Public Buildings and Institutions.

Apply bait on paper, pasteboard, or other material that will permit removal. Locate these bait stations on window sills, on floor near walls, in storage areas and other areas where insects have been observed. Maintain strict account of location and number of bait stations. Do not apply bait in edible product areas until operations have ceased for the day. Remove all bait stations from the edible products areas before resuming operations.

Before applications are to be made in food processing plants that are inspected under the Meat and Poultry Inspection Program of USDA, a blue dye must be mixed as follows with the bait before entering the plant and setting out the bait stations:

- (1) To each 5 lb container of bait add 6 teaspoonfuls of a blue food color dye (FD&C Blue No. 1).
- (2) Thoroughly mix by shaking or mechanical means until the dye is uniformly distributed throughout the bait.

Do not store BAYGON® 2% Bait in or around such processing plants.

For Use in Research Facilities: The use of BAYGON® in research animal quarters for pest control will not induce changes in liver microsomal enzyme activity in these animals. BAYGON® 2% Bait should not be applied directly on animals nor applied where animals can feed on the bait.

For Outdoor Use around patios, driveways, sidewalks, and foundations only. Apply bait evenly in a band 2 to 3 feet wide at the rate of 4 oz per 1000 sq ft around foundations, patios, driveways, or sidewalks, taking care to treat any cracks or crevices. For maximum effectiveness treat beneath concrete drain splashpans.

RESTRICTIONS

Do not apply to floors or other surfaces likely to be contacted by children or pets.

Do not apply this product in a way that will contact any person or pet, either directly or indirectly. Keep people and pets out of application area. Birds and small mammals feeding on treated bait may be killed.

Do not apply as a landscape treatment (to lawns, shrubs or trees, garden plants).

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

Pesticide Storage: Store in a cool, dry place and in such a manner as to prevent cross contamination with other pesticides, fertilizers, food, and feed. Store in original container and out of the reach of children, preferably in a locked storage area.

Handle and open container in a manner as to prevent spillage. If the container is leaking or material spilled for any reason or cause, carefully sweep material into a pile. Refer to Precautionary Statements on label for hazards associated with the handling of this material. Do not walk through spilled material. Material that cannot be used as directed should be disposed of as directed below. In spill or leak incidents, keep unauthorized people away. You may contact the Bayer Environmental Science Emergency Response Team for decontamination procedures or any other assistance that may be necessary. The Bayer Environmental Science Emergency Response Telephone No. is 1-800-334-7577, or contact Chemtrec at 800-424-9300.

Pesticide Disposal: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

Container Disposal: Completely empty container. Then dispose of empty container in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

IMPORTANT: READ BEFORE USE

Read the entire Directions for Use, Conditions, Disclaimer of Warranties and Limitations of Liability before using this product.

If terms are not acceptable, return the unopened product container at once. By using this product, user or buyer accepts the following Conditions, Disclaimer of Warranties and Limitations of Liability.

CONDITIONS: The directions for use of this product are believed to be adequate and should be followed carefully. However, because of manner of use and other factors beyond Bayer Environmental Science's control it is impossible for Bayer Environmental Science to eliminate all risks associated with the use of this product. As a result, crop injury or ineffectiveness is always possible. All such risks shall be assumed by the user or buyer.

DISCLAIMER OF WARRANTIES: BAYER ENVIRONMENTAL SCIENCE MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE, THAT EXTEND BEYOND THE STATEMENTS MADE ON THIS LABEL. No agent of Bayer Environmental Science is authorized to make any warranties beyond those contained herein or to modify the warranties contained herein. Bayer Environmental Science disclaims any liability whatsoever for special, incidental or consequential damages resulting from the use or handling of this product.

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NET WEIGHT: POUNDS



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MATERIAL SAFETY DATA SHEET

BAYER CROP SCIENCE

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Kansas City, MO 64120-0013

TRANSPORTATION EMERGENCY

CALL CHEMTREC: 800-424-9300
INTERNATIONAL: 703-527-3887

NON-TRANSPORTATION

BAYER EMERGENCY PHONE...: (800) 414-0244
BAYER INFORMATION PHONE.: (800) 842-8020

1. CHEMICAL PRODUCT IDENTIFICATION:

PRODUCT NAME.....: BAYGON 2% Bait
PRODUCT CODE.....: 21134
CHEMICAL FAMILY.....: Carbamate Insecticide
CHEMICAL NAME.....: 2-(1-Methylethoxy)phenol methylcarbamate
SYNONYMS.....: Propoxur
FORMULA.....: C11 H15 N O3

2. COMPOSITION/INFORMATION ON INGREDIENTS:

INGREDIENT NAME /CAS NUMBER	EXPOSURE LIMITS	CONCENTRATION (%)
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***** HAZARDOUS INGREDIENTS *****

BAYGON (propoxur)			
114-26-1	OSHA :	.50 mg/m3 TWA	2 %
	ACGIH:	.50 mg/m3 TWA	

3. HAZARDS IDENTIFICATION:

* EMERGENCY OVERVIEW *
*
* CAUTION! Color: Tan; Form: Solid; Granules; Odor: Slight *
* phenol; Carbamate Insecticide - Cholinesterase Inhibitor; *
* May be harmful if absorbed through skin; May be harmful if *
* swallowed. *

POTENTIAL HEALTH EFFECTS:

Product Code: 21134
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3. HAZARDS IDENTIFICATION (Continued)

ROUTE(S) OF ENTRY.....: Inhalation; Skin Contact; Skin Absorption

HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE:

ACUTE EFFECTS OF EXPOSURE.....: Inhalation, dermal absorption or ingestion of this material may result in systemic intoxication due to inhibition of the enzyme cholinesterase. The sequence of development of systemic effects varies with the route of entry, and the onset of symptoms may be delayed an hour or more. First symptoms of poisoning may be nausea, increased salivation, lacrimation, blurred vision and constricted pupils. Other symptoms of systemic poisoning include vomiting, diarrhea, abdominal cramping, dizziness and sweating. After inhalation, respiratory symptoms like tightness of chest, wheezing, and laryngeal spasms, may be pronounced at first. If the poisoning is severe, then symptoms of convulsions, low blood pressure, cardiac irregularities, loss of reflexes and coma may occur. In extreme cases, death may occur due to a combination of factors such as respiratory arrest, paralysis of respiratory muscles or intense bronchoconstrictions. Complete symptomatic recovery from sublethal poisoning usually occurs within 24 hours once the source of exposure is completely removed. Animal studies have shown that this product is mildly toxic by the oral and dermal routes. It can cause mild irritation to the conjunctiva with all irritation resolving within 7 days.

CHRONIC EFFECTS OF EXPOSURE...: Repeated exposure to small amounts of this material may result in unexpected cholinesterase depression causing symptoms such as malaise, weakness, and anorexia that resemble other illnesses such as influenza. Exposure to the concentration that would not have produced symptoms in a person that was not previously exposed may produce severe symptoms of cholinesterase inhibition in a previously exposed person. High doses of propoxur induced bladder cancers when fed to rats in one study. Cancer was not induced in several other feeding studies on rats and other mammals. The implications of these studies for humans are not known.

CARCINOGENICITY.....: This product is not listed by NTP, IARC or regulated as a carcinogen by OSHA.

MEDICAL CONDITIONS

AGGRAVATED BY EXPOSURE.....: No specific medical conditions are known which may be aggravated by exposure to the active ingredient in this product; however, any disease, medication or prior exposure which reduces normal cholinesterase activity may increase susceptibility to the toxic effects of the active ingredient.

4. FIRST AID MEASURES:

FIRST AID FOR EYES.....: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor

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3. HAZARDS IDENTIFICATION (Continued)

ROUTE(S) OF ENTRY.....: Inhalation; Skin Contact; Skin Absorption

HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE:

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6. ACCIDENTAL RELEASE MEASURES (Continued)

skin contact. Wear proper protective equipment. Carefully sweep up spilled material. Place in covered container for reuse or disposal. Scrub contaminated area with detergent and bleach solution. Repeat. Rinse with water. Contaminated soil may have to be removed and disposed. Do not allow material to enter streams, sewers, or other waterways or contact vegetation.

7. HANDLING AND STORAGE:

STORAGE TEMPERATURE(MIN/MAX): None/30-day average not to exceed 100 F
SHELF LIFE.....: Time/temperature dependent. Contact Bayer for details.
SPECIAL SENSITIVITY.....: Heat, moisture
HANDLING/STORAGE PRECAUTIONS: Store in a cool dry area designated specifically for pesticides. Do not store near any material intended for use or consumption by humans or animals.

8. PERSONAL PROTECTION:

EYE PROTECTION REQUIREMENTS.....: Goggles should be used when needed to prevent dust from getting into eyes.
SKIN PROTECTION REQUIREMENTS.....: Avoid skin contact. Wear long sleeves and trousers. Wear chemical-resistant gloves, boots or shoe covers when needed to prevent dermal exposure.
VENTILATION REQUIREMENTS.....: Maintain exposure levels below the exposure limit through the use of general and local exhaust ventilation.
RESPIRATOR REQUIREMENTS.....: If necessary under the conditions of use, wear a NIOSH-approved particulate respirator.
ADDITIONAL PROTECTIVE MEASURES.....: Clean water should be available for washing in case of eye or skin contamination. Educate and train employees in safe use of the product. Follow all label instructions. Launder clothing separately after use. Wash thoroughly after handling.

9. PHYSICAL AND CHEMICAL PROPERTIES:

PHYSICAL FORM.....: Solid; Granules
COLOR.....: Tan
ODOR.....: Slight phenol
MOLECULAR WEIGHT.....: 209.2 (for propoxur)
BOILING POINT.....: Not applicable
MELTING/FREEZING POINT....: Not applicable
SOLUBILITY IN WATER: 0.18% (for propoxur)

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9. PHYSICAL AND CHEMICAL PROPERTIES (Continued)

SPECIFIC GRAVITY: Not established
BULK DENSITY.....: Approx. 30 lb./cu ft
% VOLATILE BY VOLUME.....: Not applicable
VAPOR PRESSURE: 9.7 x 10⁻⁶ mm Hg @ 20 C (for propoxur)
VAPOR DENSITY: Not applicable (Air = 1)

10. STABILITY AND REACTIVITY:

STABILITY.....: This is a stable material.
HAZARDOUS POLYMERIZATION...: Will not occur.
INCOMPATIBILITIES.....: Alkaline materials, strong oxidants
INSTABILITY CONDITIONS.....: Sustained temperatures above 100 F
DECOMPOSITION PRODUCTS.....: Proposed compounds include: CO, CO₂, CH₃NCO,
CH₃NH₂

11. TOXICOLOGICAL INFORMATION:

Only acute studies have been performed on this product as formulated. The non-acute information pertains to the active ingredient, propoxur.

ACUTE TOXICITY

ORAL LD50.....: Male Rat: >2012 mg/kg (feeding study); Female Rat:
>1795 mg/kg (feeding study)
DERMAL LD50.....: Rabbit: >2000 mg/kg
INHALATION LC50.....: 4-hr exposure to dust: Rat: >0.850 mg/l (analytical)
-- 1-hr exposure to dust (extrapolated from 4-hr LC50): Rat: >3.4 mg/l
(analytical)
EYE EFFECTS.....: Rabbit: Mild irritation to the conjunctiva was
observed with all irritation resolving within 7 days.
SKIN EFFECTS.....: Rabbit: Not a dermal irritant.
SENSITIZATION.....: Guinea pig: Not a dermal sensitizer.
SUBCHRONIC TOXICITY...: In a 3 month dermal toxicity study, rabbits were
treated with propoxur at levels up to and including the limit dose (1000
mg/kg) for 6 hours/day, 5 days/week. There were no local or systemic effects
observed at any of the levels tested. The no-observed-effect-level (NOEL) was
1000 mg/kg. In a 13 week oral gavage study using Rhesus monkeys, a dose of 40
mg/kg/day resulted in cholinergic symptoms lasting 5-15 minutes after
administration. These symptoms included salivation, chewing, twitching and
rapid respiration. A 50% depression in plasma cholinesterase occurred by 1
hour. This returned to normal by 24 hours after administration. In an
inhalation study, in which rats were exposed to propoxur at aerosol
concentrations of 15.3, 45.3 or 139.6 mg/cubic meter for 6 hours/day, 5
days/week for a period of either 4 or 8 weeks, cholinesterase inhibition
occurred. In a subchronic study in dogs, propoxur was administered at dietary
concentrations of 60, 600 or 1800 ppm. Effects observed included decreased

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11. TOXICOLOGICAL INFORMATION (Continued)

food consumption and terminal body weights, and changes in clinical chemistries and organ weights. The NOEL was 60 ppm.

CHRONIC TOXICITY.....: In a 1 year study, dogs were administered propoxur at dietary concentrations of 200, 600 or 1800 ppm. The high dose was increased to 3600 ppm during the 41st week and subsequently to 5400 ppm from the 45th week until the end of the study. Effects at the high dose included reduced body weight gain, cholinesterase inhibition, elevated plasma cholesterol levels, increased liver weights and thymus atrophy. An additional study was conducted in which the NOEL was determined to be 70 ppm on the basis of plasma cholesterol. In a 2 year study, propoxur was administered to rats at dietary concentrations of 200, 1000 or 5000 ppm. Treatment with 5000 ppm resulted in decreased food consumption, decreased body weight gain, cholinesterase inhibition, neuropathy and muscular atrophy. The NOEL was 200 ppm. Rats were exposed to propoxur at liquid aerosol concentrations of 2.2, 10.4 or 50.5 mg/m³ for 6.3 hours/day, 5 days/week for 2 years. Cholinesterase inhibition occurred at concentrations of 10.4 mg/m³ and above. The NOEL was determined to be 2.2 mg/m³.

CARCINOGENICITY.....: Propoxur was investigated for carcinogenic effects in a 2 year feeding study on mice. Dietary concentrations of 500, 2000 or 8000 ppm were employed in the study. An increased incidence of benign liver adenomas occurred in male mice at 2000 ppm and greater. When rats were fed propoxur for 2 years in a single type of diet, urinary bladder neoplasias were observed at concentrations of 1000 ppm and above. Propoxur was not carcinogenic in other types of diets administered to rats at high doses up to and including the maximum tested concentration of 8000 ppm. In a 2 year inhalation study on rats, propoxur was determined to be nononcogenic at liquid aerosol concentrations up to and including the maximum tested concentration of 50.5 mg/m³.

MUTAGENICITY.....: A large mutagenicity database supports the conclusion that propoxur is not genotoxic. This database includes a special study to evaluate genotoxic potential using urinary bladder cells from propoxur-treated rats. This study clearly demonstrated that propoxur and its metabolites are nongenotoxic to urinary bladder cells.

DEVELOPMENTAL TOXICITY: In a developmental toxicity study using rats, propoxur was administered during gestation by oral gavage at doses of 3, 9 or 27 mg/kg. The NOEL for maternal toxicity was 3 mg/kg. No developmental effects were observed at any of the levels tested. In a developmental toxicity study using rabbits, propoxur was administered during gestation at oral doses of 3, 10 or 30 mg/kg. Developmental toxicity occurred at the maternally toxic level of 30 mg/kg. The NOEL for maternal and developmental toxicity was 10 mg/kg.

REPRODUCTION.....: In reproduction studies using rats, propoxur was administered at dietary concentrations ranging from 30 to 6000 ppm. Reproductive effects observed at parentally toxic levels included reductions in the following parameters: gestation rates, mean number of implantation sites, litter size, pup body weights, and survival rate of young. The parental and reproductive NOELs were 30 and 80 ppm, respectively.

NEUROTOXICITY: Propoxur has been investigated for delayed neurotoxicity in acute and subacute studies using hens. Maximum levels tested in the acute studies were 100 and 1000 mg/kg via intraperitoneal injection and oral gavage, respectively. Dietary concentrations up to and including 4500 ppm were tested in a 30 day subacute feeding study. There was no indication

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11. TOXICOLOGICAL INFORMATION (Continued)

of propoxur causing delayed neurotoxicity in any of these studies. In an acute neurotoxicity study using rats, propoxur was administered as a single oral dose at levels of 2, 10 or 25 mg/kg. The NOEL for motor and locomotor activity was 2 mg/kg for males and 10 mg/kg for females based on decreased activity in the figure-eight maze. All clinical signs and neurobehavioral effects were ascribed to acute cholinergic toxicity. The NOEL for neurotoxicity was 25 mg/kg for both sexes. In a 13 week neurotoxicity study, propoxur was administered to rats at dietary concentrations of 500, 2000 or 8000 ppm. Evidence of toxicity at the mid- and high-dose included reduced body weight and feed consumption, body weight-related effects on grip strength, foot splay and organ weights, and clinical chemical findings (cholinesterase inhibition and liver enzyme induction). Primary neurobehavioral changes were not evident at any dose level. There were no micropathological findings in neural or muscle tissues. Excluding cholinergic responses, the NOEL for neurotoxicity is 8000 ppm.

12. ECOLOGICAL INFORMATION:

This product is toxic to fish, birds and other wildlife. Bayer will provide a summary of specific data upon written request. As with any pesticide, this product should be used according to label directions and should be kept out of streams, lakes and other aquatic habitats of concern.

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD.....: Follow container label instructions for disposal of wastes generated during use in compliance with the FIFRA product label. In other situations, dispose in a RCRA hazardous waste landfill or incinerate in a RCRA hazardous waste incinerator. An empty container that previously contained this product is regulated as a RCRA hazardous waste and must be disposed as a hazardous waste. The container may be triple rinsed in accordance with 40 CFR 261.7 and then disposed in an EPA approved landfill. The rinsate must be managed as a RCRA hazardous waste or used in accordance with the FIFRA product label. Do not reuse the container.

14. TRANSPORTATION INFORMATION:

TECHNICAL SHIPPING NAME.....: Propoxur
FREIGHT CLASS BULK.....: Insecticides, NOI - NMFC 102120
FREIGHT CLASS PACKAGE.....: Insecticides, NOI - NMFC 102120
PRODUCT LABEL.....: Not Noted

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14. TRANSPORTATION INFORMATION (Continued)

DOT (DOMESTIC SURFACE)

HAZARD CLASS OR DIVISION: Non-Regulated

IMO / IMDG CODE (OCEAN)

HAZARD CLASS DIVISION NUMBER...: Non-Regulated

ICAO / IATA (AIR)

HAZARD CLASS DIVISION NUMBER...: Non-Regulated

15. REGULATORY INFORMATION:

OSHA STATUS.....: This product is hazardous under the criteria of
the Federal OSHA Hazard Communication Standard 29
CFR 1910.1200.
TSCA STATUS.....: This product is exempt from TSCA Regulation under
FIFRA Section 3 (2)(B)(ii) when used as a
pesticide.
CERCLA REPORTABLE QUANTITY...: 5000 pounds of formulation which contains 100
pounds of technical.
SARA TITLE III:
SECTION 302 EXTREMELY
HAZARDOUS SUBSTANCES...: No components listed
SECTION 311/312
HAZARD CATEGORIES.....: Immediate Health Hazard; Delayed Health Hazard
SECTION 313
TOXIC CHEMICALS.....: Propoxur (CAS #114-26-1) 2.0%
RCRA STATUS.....: When discarded in its purchased form, this
product is a listed RCRA hazardous waste and
should be managed as a hazardous waste. (40 CFR
261.20-24) Propoxur is listed as U411.

16. OTHER INFORMATION:

NFPA 704M RATINGS: Health Flammability Reactivity Other
 1 1 1
 0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

Bayer's method of hazard communication is comprised of Product Labels and
Material Safety Data Sheets. NFPA ratings are provided by Bayer as a customer
service.

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16. OTHER INFORMATION (Continued)

REASON FOR ISSUE.....: Revise Sections 4 (First Aid Statements); 8
(Respirator Statement); 11 (update Subchronic Tox) 15 (Transportation;
revise to ANSI format
PREPARED BY.....: V. C. Standart
APPROVED BY.....: D. C. Eberhart
TITLE.....: Director Product Safety & Stewardship
APPROVAL DATE.....: NONE
SUPERSEDES DATE.....: 12/19/1995
MSDS NUMBER.....: 08133

This information is furnished without warranty, expressed or implied, except
that it is accurate to the best knowledge of Bayer Corporation. The data on
this sheet relates only to the specific material designated herein. Bayer
Corporation assumes no legal responsibility for use or reliance upon these
data.

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Suspend[®] SC

Insecticide

Specimen Label

- * ONLY FOR SALE TO, USE AND STORAGE BY PEST CONTROL OPERATORS AND/OR COMMERCIAL APPLICATORS
- * TO BE APPLIED BY OR UNDER THE DIRECT SUPERVISION OF COMMERCIAL APPLICATORS RESPONSIBLE FOR INSECT CONTROL PROGRAMS
- * FOR RESIDENTIAL, INDUSTRIAL AND INSTITUTIONAL CONTROL OF MAJOR NUISANCE PESTS LISTED ON THE LABEL
- * CONTROLS NUMEROUS PESTS IN AND AROUND HOUSEHOLDS AND OTHER STRUCTURES
- * WILL NOT DAMAGE PAINTS, PLASTICS, FABRICS OR OTHER SURFACES WHERE WATER ALONE CAUSES NO DAMAGE
- * FOR INSECT CONTROL ON COMMERCIAL AND RESIDENTIAL TURF AND LANDSCAPE ORNAMENTAL PLANTS
- * AUTHORIZED FOR USE IN FEDERALLY INSPECTED MEAT AND POULTRY PLANTS AS A CRACK AND CREVICE TREATMENT

ACTIVE INGREDIENT:

*Deltamethrin 4.75%

OTHER INGREDIENTS: 95.25%

100.00%

*Contains 0.42 lb deltamethrin per gallon.

PRECAUCION AL USARIO: Si usted no lee ingles, no use este producto hasta que la etiqueta le haya sido explicada ampliamente. (TO THE USER: If you cannot read English, do not use this product until the label has been fully explained to you.)

**KEEP OUT OF REACH OF CHILDREN
CAUTION**

See Side Panel for First Aid And Additional Precautions

EPA Reg. No.: 432-763

EPA Est. No.:

NET CONTENTS:

Contains

DeltaGard[®]

Insecticide

**BACKED
by BAYER[™]**

Food manufacturing plants	Restaurants
Food processing plants	Schools
Food service establishments	Ships & vessels
Granaries & grain mills	Trailers
Hospitals	Trucks
Hotels	Warehouses
Houses	Wineries
Industrial buildings	

Treatments may be applied at 21-day intervals or as necessary to maintain adequate control. Remove pets and cover aquariums and terrariums before spraying. Do not apply to classrooms when in use. Do not use in aircraft cabins.

Treat specific areas that insects inhabit or where they are frequently found. Use 0.25 to 1.5 fluid ounces of Suspend SC in one gallon of water and apply to adequately cover 1000 square feet. Do not allow dripping or run-off to occur. Under conditions of severe pest infestation, when quick knockdown and/or longer residual control is desired, use one gallon of 0.06% Suspend SC per 1,000 sq. ft.

Premise Pest Control: *Cockroaches, Ants, Crickets, Silverfish, Firebrats, Centipedes, Millipedes, Cloth Moths, Earwigs, Pillbugs, Sowbugs, Scorpions and Spiders:* Apply as a coarse, low pressure spot or crack and crevice spray to areas that these pests normally inhabit. Pay particular attention to dark corners of rooms and closets; floor drains; cracks and crevices in walls; along and behind baseboards; beneath and behind sinks, stoves, refrigerators, and cabinets; around plumbing and other utility installations; doors, windows and in attics and crawl spaces. Applications may be made to floor surfaces along baseboards and around air ducts. Let surfaces dry before allowing children or pets to contact surfaces.

Pantry Pest Control: To kill adult and accessible stages of insect pests such as *Lesser Grain Borers, Grain Weevils, Flour Beetles, Saw-toothed Grain Beetles, Cigarette Beetles, Merchant Grain Beetles, Angoumois Grain Moths, Mediterranean Flour Moths, Indian Meal Moths, Grain Mites and Spider Mites:* Make applications to cupboards, shelving and storage areas. Remove all foodstuffs, all utensils, shelf paper and other objects before spraying. Allow all treated surfaces to dry and cover shelves with clean paper prior to replacing foodstuffs, utensils or other items. Any foodstuff accidentally contaminated with any spray solution should be discarded.

Crawling and Flying Insect Pests (such as flies, gnats, midges, mosquitoes, cockroaches, ants and silverfish): Apply directly to walls, ceilings, window screens and other resting areas as a residual surface treatment. May be used inside residential buildings, as well as in and around carports, garages, storage sheds, unoccupied horse stables and pet kennels.

Ants: (including Pharaoh Ants): Apply to trails, around doors and windows and other areas where ants inhabit or enter premises.

Bedbugs and Lice: Remove linens and wash before reuse. Apply to mattresses, especially tufts, folds, and edges until moist. Apply to the interior of the frame. Allow to dry before remaking bed.

Fleas, Carpet Beetles and Ticks: A total management program is recommended. It is suggested that infested areas be thoroughly vacuumed prior to treatment. These areas include all carpet, upholstered furniture, baseboards and other indoor areas frequented by pets. The vacuum cleaner bag should be discarded in an outdoor trash container upon completion. Pet bedding should be cleaned or replaced. Thoroughly apply Suspend SC to rugs, carpets, upholstered furniture,

pet beds, floor coverings, pet resting areas and other infested habitats. The quantity of finished spray required is dependent upon carpet/fabric density. Provide uniform coverage, apply until infested area is moist. Effective flea control includes controlling the source of flea infestations. This can require treatment of pets with a product registered by EPA for such use and treating outside areas frequented by pets. Suspend SC can also be applied out-of-doors for flea control. DO NOT treat pets with this product. Do not allow pets to contact treated areas until spray has dried.

Pet Kennels: For residual control of crawling and flying insects in and around these structures, apply as a general surface and/or crack and crevice spray. Optimal control results if facilities to be treated are clean and if the exterior perimeter is concurrently treated with Suspend SC. Apply only to areas of facility where animals are not present. Allow spray to dry before allowing re-entry of animals into treated areas. Do not apply to animal feed or watering equipment.

Food/Feed Handling Establishments:

For control of all labeled pests, applications are permitted in food/feed and non-food/non-feed areas of food/feed handling and processing establishments as a general surface, spot or crack and crevice treatment. Suspend SC is authorized for use in Federally Inspected Meat and Poultry Plants as a crack and crevice treatment.

Food/Feed handling establishments are defined as places other than private residences in which exposed food/feed is held, processed, prepared or served. Included also are areas for receiving, storing, packing (canning, bottling, wrapping, boxing), preparing, edible waste storage and enclosed processing systems (mills, dairies, edible oils, syrups) of food/feed. Serving areas where food/feed is exposed and the facility is in operation are also considered food/feed areas.

Non-Food/Non-Feed Areas: Examples of non-food/non-feed areas include garbage rooms, lavatories, floor drains (to sewers), entries and vestibules, offices, locker rooms, machine rooms, boiler rooms, mop closets and storage (after packaging, canning or bottling). All areas that insects inhabit or through which insects may enter should be treated.

General Surface Applications: Do not use this application method in the food/feed handling areas of the facility when the facility is in operation or foods/feeds are exposed. Do not apply directly to food/feed products. Cover or remove all food/feed processing and/or handling equipment during application. After application in food/feed processing plants, cafeterias and similar facilities, wash all equipment, benches, shelving and other surfaces which food/feed will contact. Clean food/feed handling or processing equipment and thoroughly rinse with clean, fresh water. After application in bakeries, clean all food contact surfaces thoroughly with appropriate equipment.

Spot or Crack & Crevice Applications: Except in federally inspected meat and poultry plants, spot or crack and crevice applications may be made while the facility is in operation provided exposed food is covered or removed from area being treated prior to application. Do not apply directly to food or food-handling surfaces.

In the home, do not allow spray to contact food/feed surfaces. If it does, clean surfaces with soap and water.

GENERAL PEST CONTROL OUTDOORS

Use Suspend SC to control outdoor pests by application as either a perimeter treatment, residual spray or broadcast application to lawns, grounds and ornamental plantings.

Treatment Sites: When used in accordance with label directions, Suspend SC may be applied as a perimeter treatment or as a residual spray around residential and non-residential settings. Begin applications when pests are noticed.

Residual Spray: Apply Suspend SC as a coarse low-pressure spray at the rate of 0.75 to 1.5 fl oz to surfaces of buildings, porches, screens, window frames, eaves, patios, refuse dumps, garages and lawns.

Perimeter Treatments: To help prevent infestation of buildings, apply Suspend SC where pests are active and may find entrance. It is recommended to treat a band of soil or lawn up to 6 - 10 feet wide around and adjacent to buildings and treat the building foundation to a height of 2 to 3 feet. Apply as a coarse spray at the rate of 0.25 to 1.5 fl oz of Suspend SC per gallon of water. (See Application Rate table). Use an adequate volume to thoroughly and uniformly wet the barrier area but do not allow run-off to occur.

Fleas and Ticks: Apply Suspend SC as a coarse wet spray to areas where fleas and ticks are most likely to be found, such as but not limited to, dog houses, kennels, runways, cracks and crevices in sidewalks, paths or patios, under plants, shrubs, bushes, trees, or other shaded, moist areas where pests may rest.

Fire Ants: Apply Suspend SC as a drench. Dilute 1.5 oz per one gallon of water. Gently sprinkle 1 to 2 gallons of the diluted insecticide over the surface of each mound and surrounding area to a 2-foot diameter. For best results, apply in cool weather, 65 to 80°F or in early morning or late evening hours. Treat new mounds as they appear. Pressurized sprays may disturb the ants and cause migration, reducing product effectiveness.

Wood-Infesting Insects:

For control of wood-infesting beetles on surfaces in homes and other structures, apply a 0.06% suspension of Suspend SC. For treatment of small areas, apply by brushing or spraying the suspension evenly on wood surfaces. For large or overhead areas of homes, apartment buildings, etc., apply as a coarse spray to thoroughly cover the area. Cover all surfaces below the area being sprayed with plastic sheeting or other material which can be disposed of by placing in trash if contamination from dripping occurs. Sprayed surfaces should be avoided until the treated area is completely dry.

For control of above-ground termites and wood-infesting beetles in localized areas, apply a 0.06% suspension or sufficient volume of foam of Suspend SC to voids and galleries in damaged wood and in spaces between wooden structural members and between the sill plate and foundation where wood is vulnerable. Applications may be made to inaccessible areas by drilling and then injecting the suspension or foam with a suitable directional injector into the damaged wood or wall voids. All treatment holes drilled in construction elements in commonly occupied areas of structures must be securely plugged.

Termite carton nests in building voids may be injected with 0.06% suspension or foam using a pointed injection tool. Multiple injection points to varying depths may be necessary. It is desirable to physically remove carton nest material from building voids when such nests are found.

Application to attics, crawl spaces, unfinished basements, or man-made voids may be made with a coarse fan spray of 0.06% suspension to control exposed worker and winged reproductive forms of termites. For control of swarming or reproductive stages of termites, apply a 0.06% suspension to the swarm or area on which they collect.

The purpose of such applications of Suspend SC is to kill workers or winged reproductive forms which may be present at the time of treatment. Such applications are not a substitute for mechanical alteration, soil treatment or foundation treatment but are merely a supplement.

Do not apply solution until location of heat or air conditioning ducts, vents, water and sewer lines and electrical conduits are known and identified. When located, applications may be made around these structures. However, caution must be taken to avoid contamination of these structural elements and airways.

For control of above-ground termites inside trees, utility poles, fencing and decking materials and similar structural members, drill to find the interior infested cavity and inject 0.06% suspension or foam using an appropriate treatment tool with a splashback guard.

Termite carton nests in trees may be injected with 0.06% suspension or foam using a pointed injection tool. Multiple injection points to varying depths may be necessary. It is desirable to physically remove carton nest material from trees when such nests are found.

For protection of firewood from carpenter ants and termites, treat soil beneath firewood prior to stacking with a 0.06% suspension at 1 gallon per 8 square feet to prevent carpenter ant or termite infestation. DO NOT treat firewood with this product.

For control of carpenter ants in houses and other structures, use a 0.06% suspension and apply as a general surface, spot, crack and crevice or wall void application. Apply around doors and windows and other places where carpenter ants may enter the premises. Spray or foam into cracks and crevices through small drilled holes into voids where these ants or their nests are present. Use a sufficient amount of coarse spray or foam to cover the area. Do not exceed 1 gallon of dilute suspension per 1000 square feet of treated surface.

For control of carpenter ants inside trees, utility poles, fencing and decking materials and similar structural members, drill to find the interior infested cavity and inject 0.06% suspension or foam using an appropriate treatment tool with a splashback guard.

For control of tunneling carpenter ants in soil, apply a 0.06% suspension as a drench or inject the suspension or foam at intervals of 8 to 12 inches. Establish a uniform vertical barrier at the edge of walls, driveways or other hard surfaces where ants are tunneling beneath the surfaces.

For control of carpenter bees in structures, apply a 0.06% suspension or sufficient volume of foam directly into gallery entrance holes. Following treatment, the entrance holes may be left open 24 hours to be certain that returning adult bees are killed. When there is no activity, the hole may be sealed with a suitable sealant.

Foam Application Use Directions: Suspend SC can be converted to a foam and the foam used to treat structural voids to control insect and arthropod pests in walls, under slabs or in other void areas. Mix end-use dilution of Suspend SC with manufacturer's recommended volume of foaming agent. Use the recommended rate suspension converted to a foam to achieve the desired foam expansion ratios. Verify before treatment that the foaming agent is compatible with Suspend SC.

Turfgrass Applications:

Suspend SC controls a broad spectrum of insects on turfgrasses and ornamental plants in outdoor areas such as athletic fields, recreational areas, residential landscapes, parks, and public and commercial sites.

Uniform coverage is essential. Begin applications when pests are evident.

Apply Suspend SC as a broadcast application using a conventional hydraulic boom-type sprayer or other suitable equipment for turfgrass pests according to the rates listed in the Application Rates for Turfgrass Sites table. Apply using a minimum of 2 gallons of water per 1000 sq. ft. Higher volumes (4 to 10 gallons of water per 1000 sq. ft.) may be needed for adequate coverage of dense turfgrass canopies and/or turfgrasses maintained under high mowing heights.

Target insects must be exposed to the insecticide to be controlled. For optimum control of surface-feeding insects, delay irrigation or mowing for 24 hours after application. For subsurface-feeding insects, irrigate with 0.25 to 0.5 inch of water immediately after application.

Tank Mixing: Suspend SC Insecticide has been found to be compatible with many commonly used pest control and fertilizer products. When tank-mixing Suspend SC, observe all restrictions and precautions and limitations which appear on the label of each product. For any tank-mixture which has not been previously tested, mix the correct proportion of products and water in a quart jar to ensure proper physical compatibility of the mixture. Tank mixtures of Suspend SC with silicone surfactants may improve the control of some insects.

NOTE: In New York State, product may not be applied to turf within 100 feet of a coastal marsh or stream that drains directly into a coastal marsh. For control of turf insects in New York, a second application may be made after two weeks if target insect activity persists.

Application Rates For Turfgrass Sites:

Sites	Pests	Rates	Remarks
Athletic fields, recreational areas, lawns & grounds, residential areas, parks, public and commercial sites	Ants, armyworms, centipedes, chiggers, cockroaches, crickets, cutworms, fleas (adult), grasshoppers, ground beetles, Japanese beetles (adults), leafhoppers, mealybugs, pillbugs, scorpions, sod webworms, sowbugs, springtails, spiders, ticks	0.4 to 0.6 fl oz/1000 sq. ft or 17.5 to 26 fl oz/Acre or 0.06 to 0.08 lb ai/A	Apply when pests become evident. Apply as a broadcast spray in a minimum of 2 gallons of water per 1000 sq. ft. Delay irrigation or mowing for 24 hours after application for optimum control of surface-feeders such as cutworms and webworms.
	Annual bluegrass weevil (adult), billbugs (adult), black turfgrass ataenius (adult), chinch bugs, mites*, mole crickets	0.6 to 0.9 fl oz/1000 sq. ft or 26 to 39 fl oz/Acre or 0.08 to 0.13 lb ai/A	For subsurface-feeders, such as mole crickets, irrigate with 0.25 to 0.5 inch of water immediately after application. The addition of a silicone surfactant may enhance mole cricket control.

*Suppression Only

Landscape Ornamental Treatments:

Suspend SC Insecticide provides control of a wide range of insects on landscape ornamentals. Mix Suspend SC with the required amount of water according to the Application Rates for Ornamentals table below. Thoroughly apply the finished spray to upper and lower leaf surfaces to ensure adequate coverage, but prior to dripping. Be sure to penetrate dense foliage to wet leaves, trunk and branches.

Plant safety testing has been conducted on many species of ornamental plants under a wide range of environmental and cultural conditions and no injury has been observed. If local use information is not available, it is advisable to pre-spray a few plants.

Application Rates for Ornamentals:

Sites	Pests	Rate	Remarks
Landscape ornamentals including trees, shrubs, evergreens and foliage plants	Adelgids, ants, aphids, azalea lace bugs, bagworms, boxelder bugs, cankerworms, cardamom thrips, cockroaches, crickets, elm leaf beetles, elm spanworms, European pine sawflies, fall webworms, flea beetles, flies, fungus gnats, grasshoppers, greenstriped mapleworm, Gypsy moth (larvae), imported willow leaf beetles, Japanese beetles (adults)*, June beetles (adults), lace bugs, leaf-feeding caterpillars, leafhoppers, leaf rollers, loopers, leaf skeletonizers, mealybugs, midges, mimosa webworms, mites**, orangestriped oakworms, pillbugs, pine shoot beetles, pine tip moths, pinyon spindlegall midges, plant bugs, redhumped caterpillar, red imported fire ants, sawfly larvae, sowbugs, spiders, springtails, spanworms, scale insects (crawlers), tent caterpillars, ticks, webworms, yellownecked caterpillar	4 to 8 oz/100 gallons of water	Apply when pests become evident. Thorough coverage is required for best results. Apply with sufficient water to ensure coverage of upper and lower leaf surfaces.

*Will provide anti-feedant properties on treated ornamentals against Japanese beetles.

**Suppression only.

NOTES:

1. DO NOT apply Suspend SC through any type of irrigation system.
2. DO NOT apply this product to edible crops.
3. DO NOT apply this product in hospital patient rooms while occupied or in any rooms occupied by the elderly or infirm.
4. DO NOT apply in classrooms when in use.
5. DO NOT apply to institutions (including libraries, sport facilities, etc.) in the immediate area when occupants are present.

STORAGE & DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

Storage: Mix as needed. Store in original container in a secured dry storage area. Avoid extremes in temperatures. Prevent cross-contamination with other pesticides and fertilizers. If the container is leaking and/or material is spilled, on floor or paved surfaces, absorb on sawdust or other commercially available absorbing material, sweep up and remove to chemical waste area for your disposal. Concentrate is stable at normal storage temperatures.

Pesticide Disposal: Wastes resulting from use of this product may be disposed of on site or at an approved waste disposal facility.

Container Disposal: [less than one gallon] Securely wrap container in several layers of newspaper and discard in trash. [Non-Refillable] Triple rinse (or equivalent) then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke. [Refillable] Replace the dry disconnect cap if applicable, and seal all openings which have been opened during use. Return the empty container to a collection site designated by Aventis Environmental Science. If the container has been damaged and cannot be returned according to the recommended procedures, contact the Customer Service Department at 1-800-843-1702 to obtain proper handling instructions.

IMPORTANT: READ BEFORE USE

Read the entire Directions for Use, Conditions, Disclaimer of Warranties and Limitations of Liability before using this product. If terms are not acceptable, return the unopened product container at once.

By using this product, user or buyer accepts the following conditions, disclaimer of warranties and limitations of liability.

CONDITIONS: The directions for use of this product are believed to be adequate and should be followed carefully. However, because of manner of use and other factors beyond Bayer Environmental Science's control, it is impossible for Bayer Environmental Science to eliminate all risks associated with the use of this product. As a result, crop injury or ineffectiveness is always possible. All such risks shall be assumed by the user or buyer.

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SSC-SL-9/02B

Bayer Environmental Science



MSDS Number: 000000000205

SUSPEND® SC INSECTICIDE

MSDS Version 1.2

SECTION 1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Product Name SUSPEND® SC INSECTICIDE
Chemical Name
Synonym
MSDS Number 205
Chemical Family Mixture
Chemical Formulation Mixture
EPA Registration No. 432-763
Canadian Registrat. No.

Bayer Environmental Science
95 Chestnut Ridge Road
Montvale, NJ 07645
USA

For Product Use Information: (800)331-2867 Monday through Friday(CRLF) 8:00AM-4:30PM(CRLF) For Medical Emergency contact DART: (800) 334-7577 24 Hours/Day(CRLF) For Transportation Emergency CHEMTREC: (800) 424-9300 24 Hours/Day

SECTION 2. COMPOSITION/INFORMATION ON INGREDIENTS

<u>Component Name</u>	<u>CAS No.</u>	<u>Concentration % by Weight</u>	
		<u>Minimum</u>	<u>Maximum</u>
Deltamethrin	52918-63-5	4.7500	
Inert ingredients		95.2500	

SECTION 3. HAZARDS IDENTIFICATION

NOTE: Please refer to Section 11 for detailed toxicological information.

Emergency Overview

Caution. Keep out of the reach of children. Harmful if inhaled. Contact with product may result in transient tingling and reddening of the skin. This product is extremely toxic to fresh water and estuarine fish and invertebrates.

Physical State liquid
Odor odorless
Appearance white

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Routes of Exposure	Inhalation.
Immediate Effects	
Eye	May cause slight irritation.
Skin	Contact with product may result in transient tingling and reddening of the skin.
Inhalation	Harmful if inhaled.
Signs and Symptoms	Acute overexposure may result in respiratory irritation and transient paresthesia. Chronic overexposure produced pale kidneys and discoloration of the lungs in rats.

SECTION 4. FIRST AID MEASURES

Inhalation	Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth to mouth. Get medical attention.
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SECTION 5. FIRE FIGHTING MEASURES

Flash Point	> 93 °C / > 199 °F
Suitable Extinguishing Media	carbon dioxide (CO ₂), dry chemical, foam, water
Fire Fighting Instructions	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH approved (or equivalent) and full protective gear.

SECTION 6. ACCIDENTAL RELEASE MEASURES

General and Disposal	Soak up with an absorbent material such as sand, sawdust, earth, fuller's earth, etc. Dispose of with chemical waste.
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SECTION 7. HANDLING AND STORAGE

Handling Procedures	Avoid breathing vapors and spray mist.
Storing Procedures	Do not contaminate water, food, or feed by storage or disposal. Mix as needed. Store in original container in a secured, dry storage area. Avoid exposure to extreme temperatures. Prevent cross-contamination with other pesticides and fertilizers.
Work/Hygienic Procedures	Wash with soap and water after handling. Remove and wash contaminated clothing before re-use.

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SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Eye/Face Protection	safety glasses or goggles
Body Protection	Long-sleeved shirt and long pants impervious gloves
Exposure Limits	None Established

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	white
Physical State	liquid
Odor	odorless
pH	6.6 in suspension
Specific Gravity	1.05 at 20 °C
Solubility (in water)	Suspends

SECTION 10. STABILITY AND REACTIVITY

Chemical Stability	Stable
Conditions to Avoid	Keep away from sources of ignition.
Incompatibility	strong reducing agents strong oxidizing agents
Hazardous Products of Decomposition	Decomposition Type: thermal carbon dioxide (CO ₂) carbon monoxide

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Hazardous Polymerization
(Conditions to avoid) Will not occur

SECTION 11. TOXICOLOGICAL INFORMATION

Acute Oral Toxicity	Rat: LD50: > 15,000 mg/kg
Acute Dermal Toxicity	Rabbit: LD50: > 10,000 mg/kg
Acute Inhalation Toxicity	Rat: LC50: > 1.02 mg/l 4 h Rat: LC50: > 4.08 mg/l 1 h for DOT purposes
Skin Irritation	Rabbit: Slightly irritating
Eye Irritation	Rabbit: Very slightly irritating.
Sensitization	Guinea pig: Negative
Chronic Toxicity	Deltamethrin technical is not carcinogenic based on animal studies.

Assessment Carcinogenicity

ACGIH		
None		
NTP		
None		
IARC		
Deltamethrin	52918-63-5	3
OSHA		
None		

Reproductive & Developmental Toxicity	Deltamethrin is not considered to be a reproductive toxin based on animal studies.
Teratogenicity	Deltamethrin is not considered to be teratogenic based on animal studies.

SECTION 12. ECOLOGICAL INFORMATION

Environmental Precautions	This product is extremely toxic to fresh water and estuarine fish and invertebrates. Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Use with care when applying in areas adjacent to any body of water. Do not contaminate water when disposing of equipment washwaters. This product is highly toxic to bees exposed to direct treatment or residues
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remaining on the treated areas. Do not apply this product or allow drift when bees are actively visiting the treatment area. Do not apply it or allow it to drift to crops or weeds on which bees are actively foraging.

SECTION 13. DISPOSAL CONSIDERATIONS

General Disposal Guidance	Pesticide Disposal: Wastes resulting from use of this product may be disposed of on site or at an approved waste disposal facility.
Container Disposal	Container One Gallon and Smaller: Wrap container in several layers of newspaper and discard in trash. Non-refillable Container: Triple rinse (or equivalent). Then offer for recycling or reconditioning or puncture and dispose of in a sanitary landfill or incineration, or if allowed by State and Local authorities, by burning. If burned, stay out of smoke. Refillable Container: Replace the dry disconnect cap if applicable, and seal all openings which have been opened during use. Return empty container to a collection site designated by Bayer. If container has been damaged and cannot be returned according to the recommended procedures, contact Bayer to obtain proper handling instructions.
RCRA Classification	Not Regulated under this Statute

SECTION 14. TRANSPORT INFORMATION

PROPER SHIPPING NAME: Not DOT regulated

SECTION 15. REGULATORY INFORMATION

US Federal

EPA Registration No.	432-763
TSCA list	
None	
TSCA 12b export notification	
None	
SARA Title III - section 302 - notification and information	
None	
SARA Title III - section 313 - toxic chemical release reporting	
None	

US States Regulatory

CA Prop65

This product does not contain any substances known to the State of California to cause cancer.

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This product does not contain any substances known to the State of California to cause reproductive harm.

US State right-to-know ingredients

None

Canadian Regulations

Canadian Registrat. No.

Canadian Domestic Substance List

None

Environmental

CERCLA

None

Clean Water Section 307 Priority Pollutants

None

Safe Drinking Water Act Maximum Contaminant Levels

None

International Regulations

EU Classification

Deltamethrin

R Phrases

S Phrases

52918-63-5 Toxic Dangerous for the environment
Also toxic by inhalation and if swallowed. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Keep locked-up and out of the reach of children. Avoid contact with the skin. After contact with skin, wash immediately with plenty of water. Wear suitable protective clothing, gloves and eye/face protection. In case of insufficient ventilation, wear suitable respiratory equipment. In case of accident or if you feel unwell, seek medical advice immediately (show label where possible). This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

European Inventory of Existing Commercial Substances (EINECS)

Deltamethrin

52918-63-5

Material Safety Data Sheet

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SECTION 16. OTHER INFORMATION

	Health	Flammability	Reactivity	Others
HMIS	1	1	0	B
NFPA	1	1	0	

REVISED SECTIONS:

MSDS REVISION INDICATOR: Company name change.

Print Date: 12/09/2002

Supersedes MSDS, which is older than: 12/09/2002

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