

Colgate University

Integrated Pest Management Plan Adopted: March 20, 2017

SECTION 1: SCOPE

This plan provides guidelines for protecting and enhancing the natural diversity of Colgate University's buildings and facilities and the surrounding landscape, while also supporting high-performance building operations and developing synergies between the building and its environmental context. The Integrated Pest Management (IPM) Plan covers upper and lower campus and associated grounds.

SECTION 2: GOALS

To minimize the impact of site management practices on the local ecosystem, and to reduce exposure of occupants, staff and maintenance personnel to potentially hazardous chemical, biological and particle contaminants. Colgate University's Integrated Pest Management program is a process for achieving long term, environmentally sound pest suppression through the use of a variety of management practices. These practices include structural and procedural modifications that reduce pest access, food, moisture and harborage within the school environment. Chemical methods are applied only on an "as needed" basis. Need is determined by pest population monitoring and control products are placed where they are inaccessible to children, students, faculty and staff.

At times, when chemical applications are needed, all pesticides used by the contractor must be registered with the U. S. Environmental Protection Agency, state and or local jurisdiction. Pesticide application shall be according to need and not by schedule. Such chemical control methods shall not be applied unless visual inspections or monitoring devices indicate the presence of pests in a specific area. Preventive chemical control treatments in areas where there is potential for insects or rodents will be evaluated on a case-by-case basis. When the application of chemical control products is necessary, the contractor shall employ the least hazardous materials, most precise application techniques and the minimum quantity of pesticide necessary to achieve control.

The Plan addresses environmental best practices for:

- Outdoor integrated pest management
- Indoor integrated pest management

SECTION 3: RESPONSIBLE PARTIES

Dan McCoach, architectural trades supervisor; Mike Jasper, director of operations and maintenance (Facilities Department); Emmett House, grounds supervisor (Facilities Department); with support from John Pumilio, director of sustainability, is responsible for developing and managing the implementation of the IPM Plan. Contracts with pest and landscape management vendors shall include extensive language describing their role in the building's Plan. Contractors involved with various elements of the Plan shall carry out their tasks according to their contracts, and report all relevant activities to the aforementioned parties. On occasion, several contractors may be engaged simultaneously in various elements of the Plan at the targeting building and associated grounds. To ensure an effective and coordinated effort, the building staff responsible for overseeing the Plan shall review all proposed activities before implementation.

IPM strategies for the entire property include actions performed by the following contractors:

Bartlett Tree Experts:

- **Work Performed:** Management of pests on outdoor trees and shrubs.
- **Primary Contact:** Thomas L Mullarney BCMA, local manager
- **Phone:** 315.656.2323
- **Email:** tmullarney@bartlett.com
- **Website:** <https://www.bartlett.com/>

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Ehrlich Pest Control:

- **Work Performed:** Indoor populations of rats, mice, cockroaches, ants, flies, spiders, termite swarmers, and other arthropod pests not specifically excluded from the contract.
- **Primary Contact:** David Zedack, area district manager
- **Phone:** 1.877.455.9773
- **Website:** <http://www.jcehrlich.com/green-pest-control/>

SECTION 4: QUALITY ASSURANCE CONTROL PROCESS

The party(s) responsible shall periodically evaluate the success of the Plan. This evaluation may include producing and providing a report on an annual basis to senior management. Whenever possible, the annual reports shall include an evaluation of the performance, safety, cost and environmental/public health benefits achieved as a result of its implementation.

Prior to implementation, service providers involved in the building's Plan shall submit all proposed pest management activities to the responsible parties, listed in Section 3. Upon reviewing proposed activities, the responsible parties shall determine if they meet the criteria of the Plan and approve or deny action.

The responsible parties, listed in Section 3, shall regularly communicate with all service providers, and conduct regular site inspections and evaluations to ensure that the Plan is in place and functioning as intended. In addition to ongoing quality control measures, Dan McCoach, architectural trades supervisor; Mike Jasper, director of operations and maintenance (Facilities Department); Emmett House, grounds supervisor (Facilities Department); and John Pumilio, director of sustainability, will review all practices and products prior to contract renewal (typically annually) to identify opportunities for improvement and expansion of environmentally-friendly practices.

SECTION 5: PERFORMANCE METRIC

This IPM Plan shall govern all components of pest management at the project building and site. The practices identified in this Plan shall be wholly adopted and used in 100 percent of the pest management scenarios on the Colgate main campus.

SECTION 6: IPM STRATEGIES AND PRACTICES

Outdoor Integrated Pest Management

The Contractor (Bartlett Tree Experts) works with the university to select native, disease and pest resistant species. Colgate personnel then manages outdoor plantings through hand-weeding and raking, organic mulch application, and application of pesticides only on a needed basis.

Initial Building Inspection and Establishment of Monitoring Program

The Contractor (Ehrlich) performs a thorough initial inspection of each building to evaluate the pest control needs of the premises. Ehrlich shall identify problem areas and any equipment, structural features or practices that are contributing to pest infestations. Ehrlich will then set up a pest monitoring program in those areas that contain one or more of the following: active pest infestation, pest evidence or conducive conditions. Food service areas will always be included in the monitoring program. Pest Sighting/Pesticide Application logbooks will be established for each building as part of the monitoring program.

Inspections and establishment of monitoring programs for each building shall be completed prior to any monthly inspection/treatment schedule. Access to building space will be obtained through Dan McCoach,

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architectural trades supervisor. The architectural trades supervisor will inform Ehrlich of any restricted areas requiring special scheduling.

Occupant and Custodial Reporting System

Dan McCoach, architectural trades supervisor; Mike Jasper, director of operations and maintenance (Facilities Department); Emmett House, grounds supervisor (Facilities Department); with support from John Pumilio, director of sustainability, will educate and encourage all occupants, custodians, and other frequent visitors regarding the proper protocol when addressing any pests in or around the buildings on our main campus. Specifically, individuals will be advised to submit a work order whenever evidence exists of a pest infestation. Work orders can be submitted online at: [http://www.colgate.edu/offices-and-services/facilities-\(b-g\)](http://www.colgate.edu/offices-and-services/facilities-(b-g)) or by calling Ashley Weaver at 315.228.7130. The work order will be processed and attended to within a week for non-emergency situations. Ehrlich is on campus every Wednesday to check on buildings and attend to concerns. For emergency situations such as bed bugs, rodents or bats in buildings, and other situations, Colgate has trained personnel in our Grounds Department and also in Environmental Health and Safety who will trap and treat problems promptly.

Integrated Methods

Integrated methods that make use of monitoring and non-toxic preventative measures (e.g., site inspection and maintenance, cultural controls, pest inspection and population monitoring) will be used to proactively manage and minimize pest issues. In the event that monitoring activities reveal a need for the use of pest controls, appropriate control options will be evaluated, and the least-toxic option likely to be effective will be employed.

Least-toxic Pesticides

Least-toxic pesticides are defined by the City of San Francisco's Hazard Tier 3 criteria (least hazardous): www.sfenvironment.org/downloads/library/hazard_screenings_of_pesticides.pdf.

Least-toxic pesticide status also applies to any pesticide product, other than rodent bait, that is applied in a self-contained, enclosed bait station placed in an inaccessible location, or applied in a gel that is neither visible nor accessible.

Plan of Work

Ehrlich shall submit to the architectural trades supervisor a Pest Control Plan of Work prior to inspection and establishment of the monitoring program. The architectural trades supervisor and Ehrlich will review and negotiate the Plan of Work before any pest management services begin.

The Pest Control Plan of Work will contain two service plans, Initial and Weekly/Monthly:

• INITIAL

- Initial inspection: Ehrlich will inspect the entire premises and report any structural or operational changes that would facilitate the pest control effort. Using a building floor-plan as a permanent record, the Contractor shall describe site specific solutions for eliminating pest access, food, water and harborage.
- Establishment of monitoring program: Ehrlich will monitor the facility using lo-line (or other accepted design) sticky traps to determine any existing arthropod pest problems. The contractor will then establish a monthly monitoring program in the cafeterias/food handling areas, or locations where there is an active infestation, pest evidence or conducive conditions. Monitoring locations will be recorded in the Pest Sighting/Pesticide Application logbook. Logbooks will be established for each facility and kept on the premises.
- List of proposed materials and equipment: Ehrlich shall provide current labels and Material Safety Data Sheets (MSDS) for all pesticide products to be used. In addition, the brand names shall be provided for all application equipment, rodent bait boxes, monitoring and trapping devices, and any other control equipment that may be used to provide service.

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- **WEEKLY/MONTHLY**

- Service Schedule: Ehrlich shall provide service schedules that include the weekly or monthly frequency of Contractor visits. Ehrlich will record the date of each visit in the logbook as well as all services received.
- Commercial pesticide applicator certificates or licenses: Ehrlich shall provide photocopies of the company Pest Control License and dated Pesticide Applicator Certificates for every employee who will be performing on-site services under this contract.

Emergency Conditions

In the event of an emergency, pesticides may be applied on the grounds without complying with the earlier stipulations for use of integrated and least-toxic methods.

A bed bug infestation is considered an emergency situation because of the health and disruptive nature of the problem. The contractor is required to respond within a 24-hour period, seven (7) days a week, to heat treat areas with bed bugs.

On occasion the contractor may also be requested to perform corrective or emergency service(s) that are beyond the routine requests. The contractor shall respond to these exceptional circumstances and begin the necessary work within one working day after receipt of the request.

Universal Notification

Colgate University has adopted a universal notification system if a pesticide, other than a least-toxic pesticide as defined above, must be applied on site. This strategy requires the university and its vendors to notify building occupants at least 72 hours in advance of a pesticide application under normal circumstances and no more than 24 hours after an emergency application through posted signs or other means of reaching 100 percent of occupants. This notification system enables occupants and staff, and especially high-risk occupants such as children, pregnant women and the elderly, to modify their plans based on pesticide use at the building.

Notification must include the following:

- Pesticide product name
- Active ingredient
- Product label signal word (e.g., "caution", "danger")
- Time and location of application
- Contact information for persons seeking more information

Recordkeeping

Recordkeeping is required to demonstrate ongoing compliance with the IPM plan. All applications of pesticides (including least-toxic options) shall be logged.

The contractor shall be responsible for maintaining a pest control logbook for each building. These records shall be kept on site by the architectural trades supervisor and grounds supervisor and maintained on each visit by the contractor. The logbook shall contain the following items:

1. Pest Control Plan of Work: A copy of the Pest Control Plan of Work, including the labels and MSDS sheets and service schedule.
2. Work request and inspection forms: Work request and inspection forms will be used to advise the contractor of routine service requests and to document the performance of all work, including emergency work. All work shall be documented in the logbook then signed and dated by the contractor.
3. Floor-plan service report: The Contractor will submit a monthly floor plan of the area serviced to the Pest Sighting/Pesticide Application logbook. The contractor will record any pest evidence detected by the monitoring program and the action taken. All chemical applications must be recorded on the floor plan and in response to a documented pest problem.
4. Application information for each building must include:

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- a. Universal Notification to Occupants
 - i. Date
 - ii. Time
 - iii. Method
- b. Pesticide Application Date and Time
- c. Application Manager
- d. Location
- e. Target Pest
- f. Pesticide Trade Name
- g. Pesticide Active Ingredient
- h. EPA Registration Number
- i. Least-toxic status (Y/N)

Cleaning Practices

In the event that cleaning products are used as a component of IPM, they shall meet LEED-EBOM criteria for sustainable cleaning products.

Animal & Vegetation Pest Control IPM Best Practices

Environmental best practices described below are incorporated into vendor contracts / SOP language as appropriate.

Standard Operating Procedures

- **Insect Control**
 - Emphasis on non-chemical methods: The Contractor shall use non-pesticide methods of control wherever possible, for example- use of portable vacuum for initial clean-outs of cockroach infestations, winged ants and termites or spider control, and use of trapping devices for indoor fly control.
 - Monitoring: Sticky traps shall be used to guide and evaluate indoor insect control efforts wherever necessary.
 - Insecticide bait formulations: Bait formulations shall be used for cockroach and ant control where appropriate.
 - Bed Bugs infestation will require a heat treatment method. Colgate Environmental Health and Safety (EHS) office will confirm bed bugs are present and be on location to discuss with contractor.
- **Rodent Control**
 - Indoor trapping: Rodent control inside occupied buildings shall be accomplished with trapping devices only. All such devices shall be concealed and in protected areas so as not to be disturbed by school operations. Trapping devices shall be checked every week. The Contractor or designated school personnel will be responsible for disposing of all trapped rodents or rodent carcasses in an appropriate manner.
 - Outdoor use of bait boxes: All bait boxes shall be placed out of general view where they will not be disturbed by school operations. The lids of the boxes shall be securely locked or fastened shut. All bait boxes shall be attached or anchored to the floor, wall, or other immovable surface so that the box cannot be picked up or moved. Bait shall always be placed in the baffle protected feeding chamber of the box. All bait boxes shall be labeled on the inside with the Contractor's business name and address. The Contractor's employee shall date the box at the time of installation and after each servicing.

CHEMICAL STORAGE PRACTICES

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Storage Areas	<ul style="list-style-type: none"> Storage areas must be dry, frost-free, well-ventilated and secure. Storage areas must be situated away from other buildings, especially residential buildings or areas where food or flammable materials are stored. Storage must be built to resist foreseeable accidents, including leakage and spillage, fires and the weather. Ensure there is no risk of spills polluting groundwater and local bodies of water. Floors must be impervious to liquids, anti-slip, chemical-resistant, washable and with a means of diverting spills. Drains must lead to sumps or tanks large enough to contain any foreseeable leaks. Shelving must be appropriate for the size of the containers stored in them. Flammable pesticides must be separated from other pesticides. Consideration must be given to possible reactions between chemicals coming in contact with each other.
Labels	<ul style="list-style-type: none"> Make sure all pest control chemicals are clearly labeled and that the manufacturer's instructions for use are kept with them. Chemicals must never be placed in unmarked containers.
Product Information	<ul style="list-style-type: none"> Effective first-aid provisions must be available together with data sheets on all the products in the storage room and the chemical safety precautions. Emergency telephone numbers must be listed in a key location in the storage facility. These numbers and other emergency facilities must be checked and updated as necessary.
Signage	<ul style="list-style-type: none"> Display warning signs without attracting unwanted attention.

CHEMICAL PREPARATION & HANDLING PRACTICES	
Choosing Chemicals	<ul style="list-style-type: none"> Identify which pesticides and herbicides are being used and the exact problems they are intended to resolve. The more that is known about the problem, the less chance there is of making a mistake. The words organic, natural and biodegradable in this context do not guarantee that they are safe.
Mixing Chemicals	<ul style="list-style-type: none"> Accurate measurements must be made during both mixing and application phases. Use the most suitable chemical, in the minimum necessary amount, to achieve the desired results. A safe area must be available for mixing pesticides. This must be done on a concrete pad, with a separate sump or tank to contain any leakage.
Health Precautions	<ul style="list-style-type: none"> Operators must be provided with and adequately trained in the use of the necessary equipment and protective clothing. Proper health surveillance must be available to all those working with pesticides and herbicides. Neighbors and others in the area must be warned of the spraying program in advance of and during applications.
Chemical Transport	<ul style="list-style-type: none"> Only the appropriate quantity of pesticide and herbicide must be removed from the pesticide store for immediate use. Do not transport chemicals in vehicles used for carrying people or food.

CHEMICAL APPLICATION PRACTICES	
User Qualifications	<ul style="list-style-type: none"> In many instances it will be necessary to call on outside expertise to advice on pest-management problems, particularly in the creation of customized integrated pest management problems, which may require detailed knowledge of the biology and ecology of a particular species. If pesticides are required, the IPM specialist shall communicate with Colgate's Facilities Department to determine the best product and application in accordance with approval requirements. A specialist must supervise and control the preparation and use of chemical applications.

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Species Considerations	<ul style="list-style-type: none"> ▪ Time the treatment to coincide with the presence of the pest. ▪ Use a selective chemical that has the least effect on non-target species and treat only the area affected.
User Safety	<ul style="list-style-type: none"> ▪ Users must wear protective clothing and headgear, and change clothing and wash thoroughly with soap and water after applying pest control chemicals. ▪ Ensure that anyone handling toxic chemicals never works alone and that the work area is well-ventilated. ▪ Wear a respirator for outdoor spraying or dusting of organic phosphorus compounds ▪ Eating, drinking and smoking must be prohibited when using or handling chemicals ▪ Users must be familiar with the effects on the body of the chemicals they are likely to be using, and how the chemicals may enter the body. ▪ Users must be aware of the signs and symptoms of acute poisoning related to chemicals they are using. They must stop work if they are feeling ill and seek medical advice.
Limited Access	<ul style="list-style-type: none"> ▪ The area of application must be clearly marked, and unnecessary access prevented while spraying is in progress. ▪ Building occupants must be informed of any pest-control management systems. When application or spraying is in progress, they must be warned of this activity and kept away from the area in which it is taking place. ▪ Control the reentry of people into the treated area.
Equipment	<ul style="list-style-type: none"> ▪ Equipment must be frequently checked and properly maintained, both for health and safety reasons and to minimize spray drift.
Weather/Time Restrictions	<ul style="list-style-type: none"> ▪ Spraying must not be carried out in unsuitable weather. Anyone operating sprayers must have access to a wind-speed meter and only spray when the wind speed is negligible. ▪ Hours of work must be controlled so that building occupants are not exposed.

CHEMICAL DISPOSAL PRACTICES	
Conditions of Disposal	<p>As most pesticides and herbicides are extremely toxic, proper disposal of unused chemicals is paramount to maintaining the health of building occupants and the safety of the environment. Disposal methods will depend on:</p> <ul style="list-style-type: none"> ▪ Quantity of waste for disposal ▪ Chemical and biological degradability of the active ingredients ▪ Toxic properties ▪ Concentration ▪ Physical form of the waste ▪ Disposal options available
General Guidelines	<ul style="list-style-type: none"> ▪ Always follow the manufacturer's and/or supplier's instructions even when disposing of empty containers. ▪ Landfilling or incinerating pesticides and herbicides is not an environmentally sound option. ▪ Segregate pesticide/herbicide wastes from general building wastes.
Containers/Labels	<ul style="list-style-type: none"> ▪ Never transfer pesticides to unlabelled or mislabeled containers. Keep the chemicals in clearly labeled containers even when disposing of them. ▪ Do not reuse pesticide/herbicide containers. ▪ Puncture containers after they have been used to prevent reuse.
Authorization	<ul style="list-style-type: none"> ▪ Use an authorized waste-disposal contractor. ▪ Use an authorized disposal site.

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BASIC VEGETATION PEST CONTROL PRACTICES	
Maintenance	<ul style="list-style-type: none"> Keep the building grounds well-maintained at all times. Maintenance personnel shall apply mulch to plant beds, warding off weeds and other pests.
Plantings	<ul style="list-style-type: none"> Plant at the right time and in the right places. Seedlings must not be planted too early, nor located in unsuitable conditions. Avoid monocultures by mixing plant species in planters and gardens.
Manual Controls	<ul style="list-style-type: none"> Landscaping shall be hand weeded and chemical control shall be kept to a minimum. This measure prevents human and environmental exposure to hazardous chemicals.
Chemical Controls	<ul style="list-style-type: none"> When chemical use is necessary, replace hazardous substances with least-toxic chemicals as defined by the 2007 San Francisco Reduced-Risk Pesticide List
Inspection Schedule and Location	<ul style="list-style-type: none"> The landscape contractor shall visit the site at regular intervals to monitor and apply pest controls operations.

BASIC ANIMAL PEST CONTROL PRACTICES	
Site/Building Cleanliness	<ul style="list-style-type: none"> Keep garbage containers clean, free of odors and covered at all times. Sanitation measures reduce habitat and food sources for pests. Keep areas around garbage containers free of spillage or garbage to prevent the collection of trash or debris on the ground around or underneath the containers. Keep grounds free of high weeds, trash, old equipment and debris, as these conditions create ideal harborage for rodents.
Structural Integrity	<ul style="list-style-type: none"> Maintain the building exterior in good repair with no holes or openings larger than ¼ inch including, but is not limited to, windows, doors, fans, vents, etc. Structural repairs prevent pests from entering the building. Address any deficiencies in the building exterior with corrective measures, i.e., cementing, screening, caulking, installing stripping on door bases, etc. Maintain door sweeps on all applicable doors to produce a good seal to the ground.
Inspection Schedule and Location	<ul style="list-style-type: none"> Visual inspections shall be performed at least 2 times per month, with treatment if necessary. After each visit, the pest contractor shall provide a printed service report that includes written observations, recommendations and details of IPM activities.

SPECIES-SPECIFIC ANIMAL CONTROL STRATEGIES	
Ants	<ul style="list-style-type: none"> In areas where ants are present, wipe the areas down with soapy water in order to prevent the formation of major scent trails. If there already is an established trail, wipe backwards from the food source to the entrance of the trail. Block all entry points to the building – ants will give up trying to find a way through after 1-2 days. Temporary blockades can be made using: sticky substances such as petroleum jelly, chili powder, or cinnamon, Always keep opened foodstuffs in sealed containers or store them in the refrigerator or freezer. Clean out kitchen cabinets, drawers and shelves to remove crumbs and stains. Keep sinks and worktops clean and dry. Baits are best put in the path of an ant trail and then removed after the ant activity stops, before they lure ants from another colony to the area. Prune branches close to the building and removed fences or anything that might create a bridge for the ants to cross. Low toxicity compounds to control ants include diatomaceous earth (DE), a chalk-like powder consisting of the fossilized remains of diatoms, a type of hard-shelled algae.

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<p>Aphids</p>	<ul style="list-style-type: none"> ▪ Manage sap-sucking pest mites and whiteflies by releasing predatory mites, ladybugs and lacewings onto the grounds several times over a period of weeks. ▪ Consider using parasitic wasps to control scales on trees, shrubs and flowers ▪ If it is difficult to obtain supplies of beneficial insects for release into the garden, then it is possible to purchase a branded lure that simulates the scent of aphids and attracts ladybugs and lacewings to the area
<p>Bed Bugs</p>	<ul style="list-style-type: none"> ▪ If a bed bug infestation is detected, the most effective course of action is to enlist professional help to inspect the entire building for the presence of bed bugs and treat the affected areas.
<p>Caterpillars</p>	<ul style="list-style-type: none"> ▪ Bacterial insecticides derived from natural ingredients are available to control caterpillars.
<p>Cockroaches</p>	<ul style="list-style-type: none"> ▪ Cockroaches contaminate food with their excrement and secrete an unpleasant odor that can permeate the indoor environment. ▪ There are five main species of cockroaches and effective control depends on identifying them correctly. ▪ Integrated pest management measures for controlling cockroaches include effective hygiene and exclusion practices, sticky traps lined with pheromones, and insect growth regulators. ▪ All food handling areas should be cleaned frequently. ▪ Cockroach control is best done by a professional on a contract basis, through the application of least-toxic pesticides. ▪ Control is necessary on a regular basis because of the mobility, reproduction, longevity, and behavior of cockroaches. ▪ Ensure that you know what pesticides are being used by the professional contractor and do not assume they are using an environmentally appropriate chemical.
<p>Dust Mites</p>	<ul style="list-style-type: none"> ▪ Fabrics, bedding and carpets attract and generate dust and dust mites. To keep dust mites at bay, keep building well-ventilated and dry.
<p>Flies</p>	<ul style="list-style-type: none"> ▪ Flies reproduce more readily in waste and manure, which is where control should begin. In warm weather conditions, the reproduction cycle – from egg, to larva, to pupa, to adult winged fly – requires approximately one week. ▪ Collection of waste and residues should be carried out at least twice a week. ▪ Keep refuse areas clean to avoid providing flies with breeding grounds ▪ Ensure dustbin lids fit tightly and the interiors of bins are cleaned regularly to keep surfaces free of food material. ▪ Use fine mesh window and door screens as a barrier against entry by any flying insect. ▪ Ultra-violet (UV) fly killing equipment is very effective so long as it is situated correctly. ▪ UV equipment disguised as uplighters in dining and lobby areas are discreet and highly effective because they attract and eliminate flies quickly and silently. ▪ In food preparation areas, UV equipment should only be used once all possible precautions have been taken to keep flying insects out. ▪ Position the UV equipment close to an entry point, at right angles to the nearest competing light source such as a window. In many catering establishments, poorly-situated UV equipment poses a greater food hygiene hazard than lacking pest repellants altogether. This is because when placed next to the food preparation area, they draw flies to the food which they are likely to contaminate before being killed. ▪ Natural chemical treatments include pyrethrum extracted from the Chrysanthemum cinerariaefolium plant that can be used in kitchens and restaurants.

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<p>Mosquitoes</p>	<ul style="list-style-type: none"> ▪ The best control method for mosquitoes is to eradicate their habitat. ▪ Because they like moisture and lay their eggs in standing water, it is important not to leave flower pots, buckets, plastic sheeting or other open containers outside collecting water. Ensure that any rainwater collectors are fitted with lids. ▪ Clear debris from gutters and drains to ensure there is no standing water after rain and drain unused pools or fountains so that the water cannot become stagnant. ▪ Drain or fill depressions, mud flats, and other areas that might hold water. ▪ Repair leaking taps and air-conditioning units so that puddles cannot form and ensure that septic tanks and sewage systems are properly maintained and in good working order. ▪ Avoid over-irrigating lawns and gardens, and keep weeds and grass (where the insects rest) well-clipped. ▪ If you have a pond or lake on the building grounds, fill it with mosquito-eating fish such as top-feeding minnows or goldfish – they will eat the mosquito larvae before they mature into adults. ▪ Some buildings have successfully reduced the number of mosquitoes and other insects by attracting bats to their property. A simply-built bat house will usually accommodate up to 100 bats. ▪ To prevent mosquitoes from coming indoors, fit fine-mesh screens to porches, doors and windows. ▪ If these measures are insufficient, area repellents such as citronella candles, coils or sprays will repel mosquitoes from porches, patios and other unscreened outdoor areas, although they only work well when the air is still.
<p>Fabric/Clothing Moths</p>	<ul style="list-style-type: none"> ▪ Moth larvae feed on a wide variety of natural and synthetic materials. They can be found in kitchens, food storage areas, clothing, carpets, blankets and upholstery. ▪ Fabrics should be washed and then put in bags and placed in a freezer. When taken out to thaw, shake the fabrics vigorously to remove dead larvae. ▪ Clean the areas where fabrics have been stored with vinegar and water. ▪ Store fabrics in cedar chests or closets. Place cedar chips or blocks or lavender sachets in drawers. ▪ For acute moth problems, re-usable traps can be baited with a controlled-release pheromone system to lure moths into the trap and disrupt their mating cycle. ▪ Mothballs not only have an unpleasant odor, but they are also poisonous; avoid them if possible. Insect foggers are not recommended as they can pose a health threat and are not always effective.
<p>Pantry Moths</p>	<ul style="list-style-type: none"> ▪ Clean affected areas by vacuuming all surfaces, walls, shelves, cabinets and floors. Scrub hard surfaces rigorously with hot water and detergent, especially in corners and around the edges of removable shelves. Clean all surfaces that come into contact with food. ▪ Rinse the affected areas with white vinegar, either in a spray or by wiping with a cloth. ▪ Throw away all grain-based food items as well as nuts, raisins, flour and tea, even if it is in sealed containers. ▪ Remaining food items and containers should be thoroughly cleaned with a detergent and water solution and wiped down with a vinegar rinse before being put back. Use air-tight containers made of hard plastic, glass or metal and not plastic bags. ▪ Kill any moths with a fly swatter or moth traps. ▪ After a severe infestation, freezing any new grain products and storing grain products in refrigerators or freezers can prevent reinfestation. ▪ Peppermint gum, bay leaves, peppercorns and cloves may also help deter pantry moths.

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<p>Rodents</p>	<ul style="list-style-type: none"> ▪ Rodent control should start with a survey to determine the source of the problem and the conditions that encourage the infestation. Following the survey, implement a program to kill the rodents, removing their sources of food and water, eliminating their place of refuge and making it rodent-proof, and educating and obtaining the cooperation of employees. If the food supply is removed before you eradicate them, the rodents will migrate to other areas, making elimination more difficult. ▪ Openings in building foundations and walls should be closed or screened with wire mesh that has holes not more than 1.25 cm (0.5 in) wide. Where pipes enter masonry, force heavy hardware cloth or steel wool into the opening, then fill it with concrete. ▪ Continuous surveillance is necessary, and places where rodents have been gnawing to gain entry to a building should be sealed with metal flashing. ▪ Doors are particularly vulnerable to rodent entry so ensure that external doors and windows close tightly with no gaps at the bottom. ▪ Materials stored in the open, in sheds or in building should be stacked at least 30 cm (1 ft.) above the ground. ▪ Stringent waste disposal practices should be observed – secure all waste in closed containers and not just plastic bags. ▪ Wash dustbin areas regularly. Make sure composting bins are designed to prevent rodents from entering. ▪ Traditional mouse and rat traps, or snap traps, kill instantly. If trapping efforts fail, it is usually due to too few traps being used. ▪ Bait should be sticky to ensure that the mouse triggers the trap mechanism even if it only lightly touches the bait. Mice prefer peanut butter or chocolate to cheese. Bacon, oatmeal or apples can also be used as bait. ▪ An alternative to snap traps is a battery-operated trap that generates a high-voltage once the rat or mouse is inside. The design is relative safe and can be used in areas where children, pets or wildlife may be present.
<p>Slugs and Snails</p>	<ul style="list-style-type: none"> ▪ There are various non-chemical solutions to eliminated slugs and snails, including putting salt or sharp shingle around vulnerable plants, drowning them in beer or simply throwing them over a fence. Elemental copper bands also repel snails and slugs.
<p>Wasps and Hornets</p>	<ul style="list-style-type: none"> ▪ A simple trap can be made by putting beer or a solution of jam or honey and water in an open jar around the grounds. If this does not work, there are branded traps available containing specially formulated attractant baits.
<p><Other Pest Species ></p>	