

Best Management Practices for Pest Control

Rationale

Cornell Greenhouses encourage using an integrated pest management (IPM) Program for pest management including biological, chemical and cultural control methods. Pesticides have the potential to cause harm to human health and the environment. Overuse, misuse, and careless application of pesticides can result in the accumulation of toxic substances on greenhouse structures and on plants, the possible

development of pest resistance to the products applied, and risks to the health of those working in the greenhouses. The development of an IPM program can reduce the need for pesticides. Greenhouse staff should be trained to accurately identify insects, diseases, and weeds, and to monitor all pest populations. Records should be maintained, and used in planning future management strategies.

Environmental Principle: It is important to incorporate an effective integrated pest management program to decrease reliance on pesticide use and increase the effectiveness of pesticides when needed. Decreased pesticide use will result in less potential harm to human health and the environment and will help to prevent pesticide resistance in target organisms.

Operational Aspects	Environmental Assurance >>		
	Level 1	Level 2	Level 3
Overview			
Emergency Preparedness	all staff know to call 911 in the event of an emergency; staff know where to find emergency contact numbers that are posted; staff have basic training in containing and following protocol for pesticide spills	all staff know where to find emergency contact numbers that are posted; staff have basic training in containing and following protocol for pesticide spills	staff know where to find emergency contact numbers that are posted; staff have basic training in containing and following protocol for pesticide spills ; emergency response plan is updated annually and is on file; staff are know and understand the emergency plan http://sp.ehs.cornell.edu/em/emergency-management/pages/default.aspx
Environmental Awareness	staff are informed of the impact pesticides can have on the environment	staff are introduced to alternative pest control measures and encouraged to implement them when possible; staff is trained on impact of pesticides	staff are expected to incorporate IPM practices to maximize the benefits of pesticide applications while reducing environmental risks

Operational Aspects	Environmental Assurance >>		
	Level 1	Level 2	Level 3
Training	all staff and greenhouse users are trained, minimally, as Federal Worker Protection Standard Workers http://www.epa.gov/agriculture/epa-735-b-05-002.pdf ; all staff and greenhouse users responsible for pesticide applications are in compliance with Cornell, state and federal regulations regarding applicator training http://greenhouse.cals.cornell.edu/pdf/EquipmentUseandSafety/Environmental%20training%2010-26-11.pdf	all staff and greenhouse users are trained, minimally, as Federal Worker Protection Standard Handlers; all staff and greenhouse users responsible for pesticide applications are in compliance with Cornell, state and federal regulations regarding applicator training; staff trained on impact of pesticides; all staff are trained in basic IPM	all staff and greenhouse users are trained, minimally, as Federal Worker Protection Standard Handlers; all staff and greenhouse users responsible for pesticide applications are in compliance with Cornell, state and federal regulations regarding applicator training; all staff are trained in IPM
Communication	pest management requests are communicated orally and with fairly short notice to those responsible for implementation	pest management plans are communicated well in advance to those responsible for implementation	written pest management plans are submitted before each project begins; meeting is held with greenhouse staff to discuss integrated pest management strategies as appropriate to the project
Management			
Monitoring and Recordkeeping	records are kept of significant insect pests, disease and weed problems	records are kept of weekly scouting results, monitoring methods used as appropriate for insects, diseases and weeds	designated person to scout monitors and maintains records weekly, and makes pest control decisions
Biological Control	appropriate beneficial insects or microbials are introduced early in the course of pest population growth;	appropriate beneficial insects or microbials are introduced early in the course of pest population growth; pesticides used offer least toxicity to beneficials; pesticide applications are minimized	appropriate beneficial insects or microbials are introduced early in the course of pest population growth; biological and microbial control IPM program is in place; needs for beneficial insects and microbials are anticipated based on experience of past seasons; minimal pesticide use as appropriate to the research design

Operational Aspects	Environmental Assurance >>		
	Level 1	Level 2	Level 3
Pest Containment	greenhouses with infected or infested plants are posted	all users are informed of infected or infested greenhouses; all new plants are carefully inspected before they enter greenhouse; movement of people, equipment or plants carrying pests is restricted; greenhouse staff and users avoid contact with infected or infested plants	all users are informed of infected or infested greenhouses; all new plants are carefully inspected; movement of people, equipment or plants carrying pests is restricted; greenhouse staff and users avoid contact with infected or infested plants; infected or infested plants are quarantined or destroyed
Pest Exclusion	doors to head houses, greenhouses and plant growth rooms are kept shut	if quarantine space is available, all new plants remain in quarantine for an appropriate period before they enter greenhouse; doors to head houses, greenhouses and plant growth rooms are kept shut; insect screens installed over vents whenever possible, integrity of screens is checked annually; plants are carefully inspected	if quarantine space is available, all new plants remain in quarantine for an appropriate period before they enter greenhouse; doors to head houses, greenhouses and plant growth rooms are kept shut; plants are carefully inspected; appropriate for plants in the greenhouse screens installed over vents whenever possible, integrity checked regularly; door seal checked regularly; cracks in structure sealed to prevent movement of pests in or out; foot bath or pad kept are present and maintained to clean shoes before entering where appropriate; gravel barriers around outside perimeter to prevent movement of pests
Chemical Selection	after pest identification, an appropriate recommended legal product for the crop and pest is used, applied according to the label; the development of pest resistance to products is mitigated through consideration of alternate modes of action	after pest identification, an appropriate recommended legal product for the crop and pest is used, applied according to the label; the development of pest resistance to products is mitigated through consideration of alternate modes of action	after pest identification, an appropriate recommended legal product for the crop and pest is used, applied only as needed and according to the label; development of pest resistance to products is mitigated through consideration of alternate modes of action; reduced risk pesticides, such as insect growth regulators, are selected whenever possible; when possible select chemicals appropriate/compatible with biological control

Operational Aspects	Environmental Assurance >>		
	Level 1	Level 2	Level 3
Plant Growth	water and fertilizer applied for optimal plant growth; pot size appropriate for plant	water and fertilizer applied for optimal plant growth; pot size appropriate for plant; plants are repotted, pruned, spaced, staked and tied as needed	water and fertilizer applied for optimal plant growth; pot size appropriate for plant; provide optimal airflow, lighting and temperature conditions ; plants are transplanted, staked, tied, pruned and spaced, as needed
Sanitation	bench tops, floors, pots & equipment are cleaned and disinfected and greenhouse is disease- and insect-free at beginning of project	bench tops, floors, pots & equipment are cleaned and disinfected and greenhouse is disease- and insect-free at beginning of project; debris and infected plant material removed in a timely manner during project; compost containers are covered in the greenhouses and hallways; tools are routinely appropriately disinfected during the project	bench tops, floors, pots & equipment are cleaned disinfected and plants are disease- and insect-free at beginning of project; debris and infected plant material removed immediately during project; compost containers are covered in the greenhouses and hallways; tools are routinely appropriately disinfected during the project; appropriately disinfect floors and available surfaces during the project
Handling			
Pesticide Application Safety	applications made by certified pesticide applicator; standard Federal Worker Protection Standard (WPS) protocols are followed and label requirements are met	applications made by certified pesticide applicator; standard Federal Worker Protection Standard (WPS) protocols are followed and label requirements are met; for safety, supervisors notified when application is going to be made	applications made by certified pesticide applicator; standard Federal Worker Protection Standard (WPS) protocols are followed and label requirements are met; for safety, supervisors notified when application is going to be made an additional person is present during the application with a scheduled check-in
Pesticide Application Technique	calendar-based applications are avoided; spot applications used by preference when appropriate	calendar-based applications are avoided; spot applications used by preference when appropriate; applications based on scouting results	calendar-based applications are avoided; spot applications used by preference when appropriate; applications based on scouting results and timed to the susceptible stage of the pest or disease; application method (hydraulic, Ultra Low Volume (ULV), aerosol, etc.) is chosen to ensure good coverage of the plant surface

Operational Aspects	Environmental Assurance >>		
	Level 1	Level 2	Level 3
Pruning and Rogueing	dead, infected or infested plants are discarded into a covered compost container and removed from the greenhouse weekly;	infected or infested plant tissue is pruned and discarded when transplanting; dead, infected or infested plants are discarded into a covered compost container and removed from the greenhouse daily;	infected or infested plant tissue is pruned and discarded weekly; dead, infected or infested plants are discarded into a covered compost container and removed from the greenhouse daily; more severely infested or infected plant material is disposed of under specific requirements