Integrated Pest Management
At Boise State University

Purpose

The purpose of this document is to provide an overview of Boise State University Landscape Service department's philosophy regarding plant health care, pest control and to set guidelines for implementing this program.

Mission

The mission of this program is to control pests that are harmful to the health or aesthetic value of the department's plantings on campus in a manner that is safe, cost effective and responsible to our environment.

Integrated Pest Management

Integrated Pest Management is an approach to pest control that utilizes regular monitoring to identify pests and make sound ecological decisions regarding control measures. IPM requires educated professionals identify pests through regular monitoring, decide if pest populations exceed thresholds of damage or annoyance, decide what control measures to take which may include physical, mechanical, cultural, biological, and educational and evaluate the results. Treatments are not pre-determined, rather treatments are only made when monitoring shows a pest population will cause unacceptable economic, aesthetic or medical damage. Treatments are chosen and timed to be the most effective and least hazardous to non-target organisms and the environment in general.

Components

1. Identification
    - Pest
    - Natural predators

2. Monitoring
    - Develop a record keeping system for regular sampling of pest and natural predator populations.

3. Determination of damage or potential for damage.
    - Size of population
    - Amount of damage or potential damage that can be tolerated
    - Time of season
    - Life stage of pest or host

4. Integration of treatment methods
    - Most effective
    - Least disruptive to natural controls
    - Least hazardous to human health or environment

5. Evaluation
    - Evaluate results of treatment actions

Identification (Common Pests found at BSU)

Plant Pests

1. Turf Pests
    - Insects
        - Billbugs
    - Weeds
        - Dandelions
        - White Clover
        - Mallow
        - Oxalis
        - Black Medic
    - Pathogens
        - Melting out
        - Dollar Spot
        - Brown Patch
        - Grey Leaf Blotch
        - Brown Leaf Blotch
    - Others
        - Geese

2. Ornamental Plants
    - Insects/Bugs
        - Aphids
    - Weeds
        - Mallow
        - Oxalis
        - Canada Thistle
        - Dandelion
        - Clover
        - Prickly Lettuce
        - Kosha
    - Pathogen

        - Powdery Mildew
    - Others

3. Trees
    - Insects
        - Aphids
        - Ash Borer’s
    - Weeds
        - Various (See Ornamental Plants)
    - Pathogens
        - Slime Flux
    - Others

4. Annoyance/Dangerous Pests
    - Spiders
        - Black Widow
        - Hobo
    - Ants
        - Various
    - Squirrels/Animals
        - Squirrels
        - Rock Chuck
        - Gopher
        - Geese
        - Badger
        - Racoon

Monitoring

Landscape Services employees monitor for pests through the normal scope of their daily tasks. In addition, Senior Landscape Technicians will monitor for specific pests during times of the year that infestations have been noted in previous years. All employees will document their findings on a pest identification sheet and submit the information to the Landscape Foreman.

Determination of damage or potential damage

Once a potential pest problem has been identified the Landscape Foreman will determine if the pest population has exceeded a threshold to an extent that damage is likely.

Chemical Control Measures

All pest control measures will be determined by the Landscape Foreman or a designated Senior Landscape Technician prior to chemical applications. Once a control measure has been approved the Landscape Foreman will determine proper timing for a treatment and assign the task. If a chemical control method is chosen the Landscape Foreman or designee (Senior Landscape Technician) will use the " Criteria for Chemical Control" list choose the best possible chemical control method.

Safety

BSU Landscape services recognizes that all chemicals have inherent hazards and will strictly adhere to the product label instructions pertaining to use, PPE requirements, hazards to the environment and label rates. Only employees that are currently licensed in the State of Idaho will apply chemical pesticides. Before control measures are performed the Landscape Foreman will meet with the applicator and determine possible hazards to the applicator, public, environment and natural predator populations and notify the applicator of required Personal Protective Equipment (PPE's). Applicators will be responsible for wearing their PPE's. Applicators that fail to follow label instructions and requirements will be subject to disciplinary action.

Evaluation of Control Measures

Senior Landscape Technicians will evaluate and document results of all control measures. Ineffective results will require discussion with supervisors and determination of further control measures. Landscape Services Supervisors will use all information to annually determine a list of acceptable pesticides for use on Boise State University property under their responsibility

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Procedure for use of chemical pesticides

Pesticide application equipment and PPE's shall be used and maintained in a safe condition and manner. All application equipment will be calibrated annually and routinely inspected prior to chemical applications or a change in type of product. Employees will consider the label the law and follow all recommendations. Backflow devices will be used when filling tanks in accordance to the Idaho State Drinking Water Regulations. "Criteria for choosing a pest control method" will be used to determine the best control method and chemical pesticides used shall be obtained via a list approved and supplied by appropriate supervisors. Applications will be performed during appropriate weather conditions. Treated areas will be posted for a period of time as recommended by product labels. Usually this time frame is "until pesticide has dried or dusts have settled". All applications will be recorded.

Approved Pest Control Strategies

Landscape Services recognizes there is an infinite amount of possible control strategies available. This is a partial list of examples available. Priorities shall be prevention through policy, planning, and avoidance measures (maintaining healthy plant material and instituting proper design techniques). Next are controls though cultural and mechanical practices, trapping and biological controls followed by biological sprays and chemical control methods.

Prevention

Use of resistant or tolerant species of plant material
Prioritization of campus areas
Proper spacing
Use of diverse species
Elimination of alternate hosts
Design standards
Proper grading and drainage
Investigation of soils
Use of Xeriscape

Control through Non-Spray Techniques

Cultural Practices

- Knowledge of individual plant species
- Irrigation scheduling and design
- Fertilization strategies
- Aeration

Mechanical Controls

- Pruning dead or diseased wood
- Pruning for air circulation
- Mulching of beds
- Edging turf
- Mowing heights for turf vigor
- Dead-heading shrubbery and annual flowers
- Hand weeding

Non-Chemical controls

- Biological controls – introducing natural predators, parasites or microbes
- Trapping
- Use of Animal control experts

Chemical Controls

- Horticultural oils

- Insecticidal soaps
- Biological pesticides
- Chemical pesticides

Criteria for Choosing a Chemical Control Measure

This list of criteria shall be used as a guideline for evaluating a chemical pesticide approval.

- Toxicity: Oral, dermal and inhalation –The highest LD_{50} rating should be the first choice.
- Acute and chronic human health effects shall be considered.
- Persistence in the environment
- Re-entry level
- Effectiveness – Does the product work on the target?
- Host specificity
- Application techniques
- Cost
- Effects on non-target organisms
- Hazards to domestic animals and wildlife
- New, increased or renewed pest resurgence, resistance, secondary pest outbreaks
- Potential for human exposure
- Potential for property damage
- Historic performance evaluation

Certification and training

Landscape Services will only allow State Licensed Professional Pesticide Applicators to approve, supervise, monitor or apply chemical pest control applications. To obtain a Professional Pesticide Applicator's License, applicators must pass a series of tests given by the State Department of Agriculture. Testing may include: Laws and Safety, Ornamental Herbicides, Ornamental Insecticides, or other appropriate license categories. Licensed applicator's are legally liable if they apply chemical pesticides contrary to State and Federal Laws and label directions. All continuing education shall be made available by Boise State University to satisfy State requirements for renewal of employees' Applicator Licenses each year.

Storage of Chemical Pesticides

Boise State University Landscape Services adheres to all laws and regulations regarding Storage of Chemical Pesticides. Chemical pesticides are kept in a well-vented safe and secure location. The areas are labeled in a proper manner and contain secondary containment spill kits, fire suppression equipment and emergency response information. Pesticides are safe-guarded from environmental damage and quantities are kept at a minimum. Pesticides will be inventoried and inspected on a monthly basis and a inventory log will be maintained to record expiration dates, label condition and container integrity.

Chemical Application records

Details of pesticide applications will be recorded and kept for three years. A master file will be kept in the Landscape Services office.

Site Notification

Landscape Services will notify the public through signage when areas of campus are treated with chemical pesticides. Signage will be posted in clearly visible locations, at conspicuous entries throughout the site of chemical application. Signage will be posted at approximately 200 ft. intervals. Notification will remain for 24 hours, or as required by label instructions, whatever time interval is longest. Signage will include the name of the chemical applied, re-entry information and a phone number where additional information may be obtained.

Rodents/Mammals

To insure the safe and proper handling of rodents or larger mammals with the exception of squirrels, Landscape Services will contact agencies or organizations trained in animal control to remove problem mammals from the campus. As a department policy, Landscape Services strives to contact animal rescue operations first, but may contact other agencies when issues of public safety arise.

Use of Remaining Chemicals/ Rinsates

Several strategies are used to avoid pesticide waste generation. Elimination of waste material will be achieved through planning, purchasing precise amounts needed and mixing just enough material to finish the job.

If waste material is generated Landscape Services will coordinate disposal through BSU's Environmental Health Officer. Empty pesticide containers will be triple rinsed and disposed of in a manner consistent with the product label. Chemical pesticide residues or rinsate will be applied to target pest populations according to product labels or added to the next tank mix of that product.

Following are some considerations to make before starting to spray to assure the proper amount of chemical pesticide is mixed.

Advance considerations:

- Weather conditions/predictions
- Acreage/square footage of target area
- Calendar: Special events, mowing, irrigation schedules etc.
- Appropriate equipment to do the job

When applying chemical pesticides use the following procedures to reduce the probability of excess pesticide solution. These are secondary to label information and State and Federal regulation.

Application procedures:

- Mix pesticides according to product labels instructions.
- Apply pesticide until tank is empty, or solution level is such that there is no flow through nozzle.
- Dilute remaining solution by rinsing the interior sides of the equipment and filling the tank ¼ full.
- Run the diluted mixture through the pump and nozzle back into the tank.
- Apply rinsate according to pesticide label.

Rinse sprayer if the following conditions apply:

- Next application will use a pesticide non-compatible to previous pesticide.
- It is the end of spraying cycle.

Use the following rinse process:

1. Read the product label. He following should not conflict with label information or State or Federal regulations.
2. Wear all PPE's as listed on the product label or MSDS when handling pesticides, containers or equipment used in applications.

3. Fill the spray tank about ¼ full with clean water. Add a neutralizing agent if the label recommends one or you are switching from a non-selective pesticide to a selective pesticide.
4. Agitate so that all inside surfaces are washed.
5. Apply rinse to target area. Be sure to run rinse through all nozzles etc.
6. Apply in a uniform manner: Do not pond target area.
7. Prior to tank storage repeat two more times without neutralizing agent.

Disposal of Empty Pesticide containers and Unusable Pesticides

Landscape Services understands that proper disposal of pesticide containers and unused material is of the highest importance to the safety of the environment, public and employees.
Landscape Services shall dispose of all chemical pesticides and related containers in a manner that is consistent with all State and Federal regulations and label instructions. Disposal of these materials requires use of all PPE's reqired by product labels. Unsafe or unauthorized procedures will be cause for disciplinary action.

Response to no-spray requests

Landscape services will evaluate all requests to cease chemical applications in a specific area on a short-term basis and make a determination on a case-by-case basis. Requests should be made directly to the Landscape Services manager for evaluation.