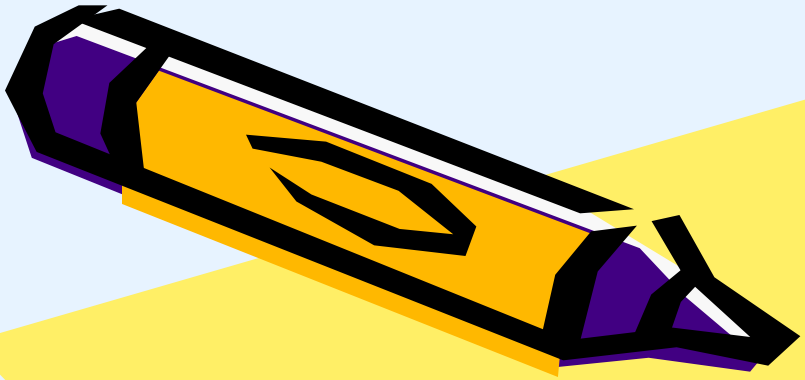

IPM Treatment Strategies

Nebraska Extension

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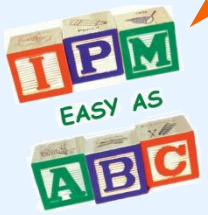
Selection

- Consider treatment options that are:
  - Least hazardous to human health
  - Least disruptive to normal activities
  - Least toxic to natural control agents and nontarget organisms
  - Most likely to be permanent and prevent recurrence of the problem
  - Easiest to carry out safely and effectively
  - Most cost effective
  - Appropriate to the site and maintenance system



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Types of Treatment Strategies

- Education
- Habitat Modification
- Sanitation
- Exclusion
- Physical/Mechanical Controls
- Cultural Controls
- Biological Controls
- Chemical Controls

Photo: University of Nebraska–Lincoln

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Education

- Teach IPM to administrators, staff, residents, parents, and children through educational programs and activities
  - Create handouts to teach about IPM
  - Present IPM workshops
  - Conduct individual meetings with staff and administrators

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Education

- Use classroom curriculums to teach children about IPM
- Conduct pest assessments that include maintenance staff and administrators

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Benefits of Education

- Cost-effective
- Changes negative behaviors that allow pests to thrive
- Use of highly toxic pesticides are replaced with equally effective alternatives to control pests
- Children carry pest management knowledge into adulthood

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Habitat Modification

- Pests need food, water, and shelter for survival. Eliminate or reduce these resources to discourage pests
  - Eliminate food sources—sanitation, sanitation, sanitation!

A feast for a pest!

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Habitat Modification

- Eliminate water sources—fix leaks, spills, standing water

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Habitat Modification

- Eliminate pest shelter
  - ✓design or redesign structural features to discourage pests (i.e. unsuitable roosting ledges equals fewer pigeons)
  - ✓remove dense vegetation and clutter near buildings to discourage rodents

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Sanitation

- Keep counters and floors clean and picked up
- Keep trash bins emptied and clean; dumpsters well away from buildings

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Sanitation

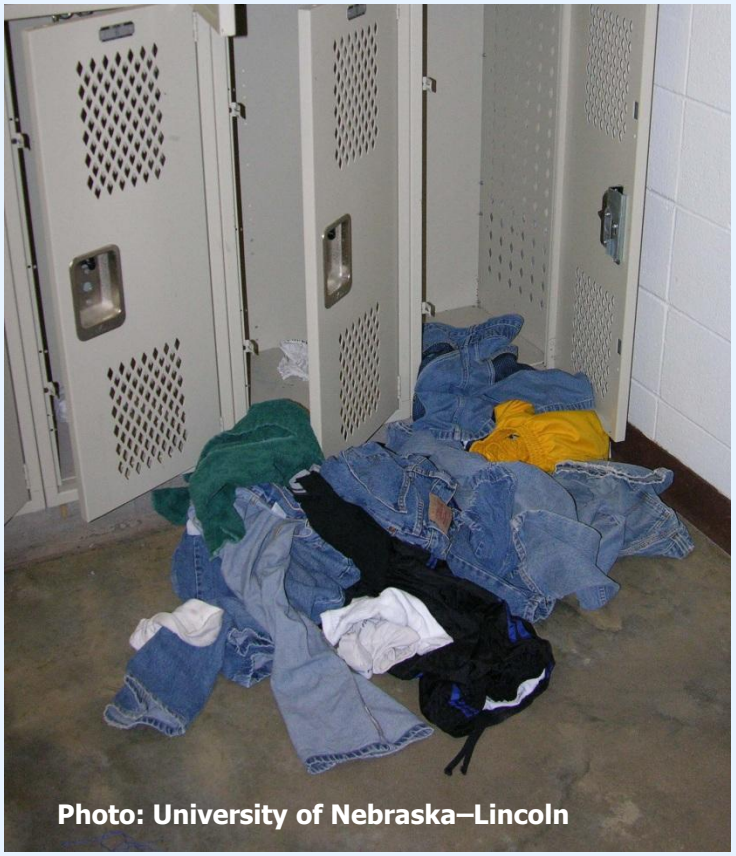
Photo: University of Nebraska–Lincoln

A clothes pile like this could be home sweet home for a rodent

- Reduce clutter to discourage pest hiding places
  - Keep supplies neatly organized on shelves
  - Pick up clothes in locker rooms and closets
  - Avoid stacking materials close to buildings

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Sanitation

- Vacuum floors (including in corners and under furniture, sinks, etc.) regularly to remove food debris that can attract pests
- Clean up spills and crumbs immediately, and throw away empty wrappers and pop cans

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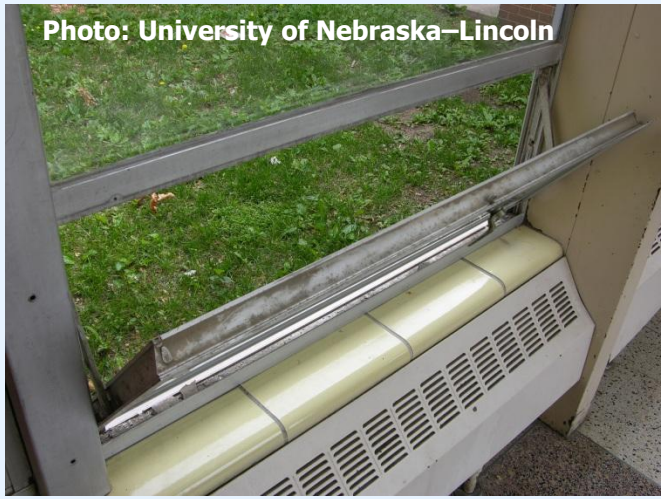
Exclusion

- Techniques to prevent pests from gaining entry into or hiding places within buildings:
  - Keep window screens in place
  - Store food items in pest-proof containers
  - Screen exhaust vents where pests might be able to enter
  - Caulk and seal cracks and crevices to exclude pests from hiding places



Keep screens on windows to prevent pest entry

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Physical/Mechanical

- Vacuuming—can be used to control live and dead pests, especially in out of reach areas
- Trapping—sticky, snap, cage traps available to monitor and control pests
- Barriers—good exclusion technique to keep pests out (screens, footings, electric fences)

Photo: University of Nebraska–Lincoln

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Physical/Mechanical

- Heat, cold, electric current—capture pests and place in freezer or use electric or commercial heat treatments
- Manual pest removal—hand remove pests as you find them!

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Cultural Controls

- Attract them, and they will come: create a less desirable environment for pests by…
  - Choosing landscape plants that are less attractive or resistant to pests
  - Using yellow lights that don't draw in flying insects

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Biological Controls

- Use natural enemies to control pests
  - Conservation—preserve the beneficials already present in the environment
    - ✓ treat area only if pests surpass acceptable injury levels
    - ✓ spot treat to reduce risk to nontargets
    - ✓ select treatments that will be least disruptive to natural life cycles of predators
    - ✓ use the most species specific, least damaging pesticide products (insect growth regulators, baits specific to target pest, etc.)

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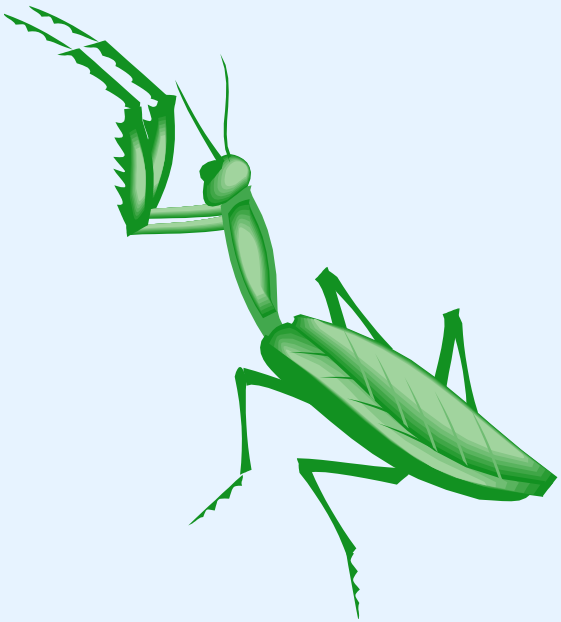
Biological Controls

- Augmentation—provide plants that attract beneficials; purchase beneficial insects and place in the environment
- Importation—bring natural enemies from their native countries in to control pests
- Microbials—control pests with naturally occurring bacteria, fungi, etc. (i.e. Bt (*Bacillus thuringiensis)*



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Chemical Controls

- Least toxic chemical controls
  - Pheromones—chemical signals used by insects to attract or alert of danger; can be used to lure insects into traps
  - Insect Growth Regulators (IGRs)—chemicals that prevent immature insects from maturing into adults and thus, make them unable to reproduce

Drawing: Ami Sheffield

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Chemical Controls

Pheromone traps, such those seen here, lure insects with chemical signals. An example is female pheromones used to attract male Indian meal moths.

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Chemical Controls

- Least toxic chemical controls
  - Desiccating Dusts—abrade the waxy coating of insects, making them dry out. Diatomaceous Earth and silica aerogel are examples
  - Pesticidal Soaps and Oils—kill pests but have low toxicity to mammals; gentle on the environment
  - Botanical Pesticides—derived from plants, such as pyrethrum; good at killing a wide range of insects

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Chemical Controls

- Least toxic chemical controls
  - Baits—placed in areas not accessible to people or pets.
  - Boric acid—placed in cracks, crevices, and around baseboards in areas not accessible to people or pets.

Applying large amounts of boric acid, as seen here, is not necessary. Use a thin, light layer. Insects will more easily pick up the material this way.

Photo: University of Nebraska–Lincoln

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Chemical Controls

Boric acid can be applied in cracks and crevices

Photo: Nebraska Extension in Lancaster County

Place bait stations in places out of the way of people or pets

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Pesticide Selection

- When choosing a pesticide, consider the following:
  - Safety
  - Species Specificity
  - Effectiveness
  - Endurance
  - Speed
  - Cost

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Keep in Mind…

- Notify administrators, staff, parents, students, and residents before using ANY pesticide
- Make sure pesticide is registered in your state before using
  - http://www.kellysolutions.com/NE/pesticideindex.htm
- Always **READ THE LABEL**
- Use personal protective equipment (PPE) listed on the label

Photo: Nebraska Extension in Lancaster County

Read the label before using pesticides!

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Keep in Mind…

- Verify that person applying the pesticide is properly trained and certified
- Keep records of all applications
- Continue to monitor pest populations after application
- Be prepared for emergencies and accidental spills or poisonings
- Store and dispose of pesticides properly

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Credits

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  - Clyde Ogg, Nebraska Extension
- Content Editor
  - Erin Bauer, Nebraska Extension
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  - Erin Bauer, Nebraska Extension
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- Artwork
  - Ami Sheffield

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