

1. E8 Integrated Pest Management (IPM) Action Plan



IPM Action Plan, Introduction

Integrated Pest Management (IPM) a sustainable approach to reduce pests to a tolerable level by using the *best balance* of cultural, physical, biological, and chemical methods while *minimizing* economic, environmental, and health risks.

The combination of methods must

- Reduce pest harm
- Be practical
- Be economical
- Minimize environmental impact

IPM Action Plan, Introduction

Why practice IPM?

- **IPM combines knowledge of the pest and how it causes harm with action thresholds and multiple approaches.**
- **IPM often reduces pesticide use.**
- **An effective IPM Plan reduces harm to people, non-target organisms, and to the environment.**

IPM Steps for Turf and Ornamentals (T&O)

Components of an IPM Action Plan

- 1. Plan ahead**
- 2. Monitor for pests to be managed.**
- 3. Identify pests and learn their biology.**
- 4. Establish pest management goals and thresholds.**
- 5. Select management strategies.**
- 6. Develop and implement the IPM Plan.**
- 7. Record and evaluate results.**

IPM Steps for T&O

Plan ahead

- **Planning can save time and money.**
- **Can lead to a more effective control program.**
- **Plan the scouting in addition to the chemical treatment plan.**
- **Plan application times when the pests are most vulnerable.**

IPM Steps for T&O

Monitor pests to be managed

- **Planning needs to include where the best places are to find the pests.**
- **Make sure tools and supplies are ready including traps and sticky cards as necessary.**

IPM Steps for T&O

Identify pests and learn pest biology

- Know which pests are common in your area and site.
- Understand pest biology and use this knowledge to maximize the effectiveness of pesticide applications.
- Pest knowledge and careful monitoring are the best tools for making pest management decisions.

IPM Steps for T&O

Establish goals, injury and action thresholds

- **Economic threshold** the pest population density when pest damage causes a reduction in the value of the crop or plant that is greater than the cost of control.
- **Economic threshold** may also be referred to as action threshold or treatment threshold.

IPM Steps for T&O

Establish goals, injury and action thresholds.

- **Aesthetic threshold** the pest population density level when pest management measures must be applied to prevent reaching unacceptable levels of aesthetic (quality of appearance) damage to a plant or landscape.

- **Environmental thresholds** the pest population density when management measures must be applied to prevent reaching unacceptable damage to the environment.

IPM Steps for T&O

Select management strategies

IPM strategies

- Do nothing
- Cultural and sanitation control
- Physical or mechanical control
- Biological control
- Chemical control
- Genetic control (tolerant or resistant plants)

IPM Steps for T&O

Select management strategies criteria

- Effectiveness of treatment
- Cost and ease of treatment
- Availability of equipment, supplies, and expertise
- Environmental protection
- Human safety and health
- Use, function, or purpose of site
- History of site

IPM Steps for T&O

Develop and Implement your plan

Prepare a written plan.

- **Include a map with location for control measures and a schedule for implementing the plan.**
- **Note any environmental precautions.**
- **Monitor weather reports to ensure safe conditions and adjust the plan if needed.**

IPM Steps for T&O

Record and evaluate results

- Record the results of the management actions.
- Evaluate the results for selecting among future management action options.

Short Summary

1. Plan ahead
2. Monitor for pests to be managed
3. Identify pests and learn their biology
4. Establish pest management goals and thresholds
5. Select management strategies
6. Develop and implement the IPM Plan
7. Record and evaluate results

Quick Questions

What is the first IPM strategy you should consider?

Do nothing

Why practice IPM?

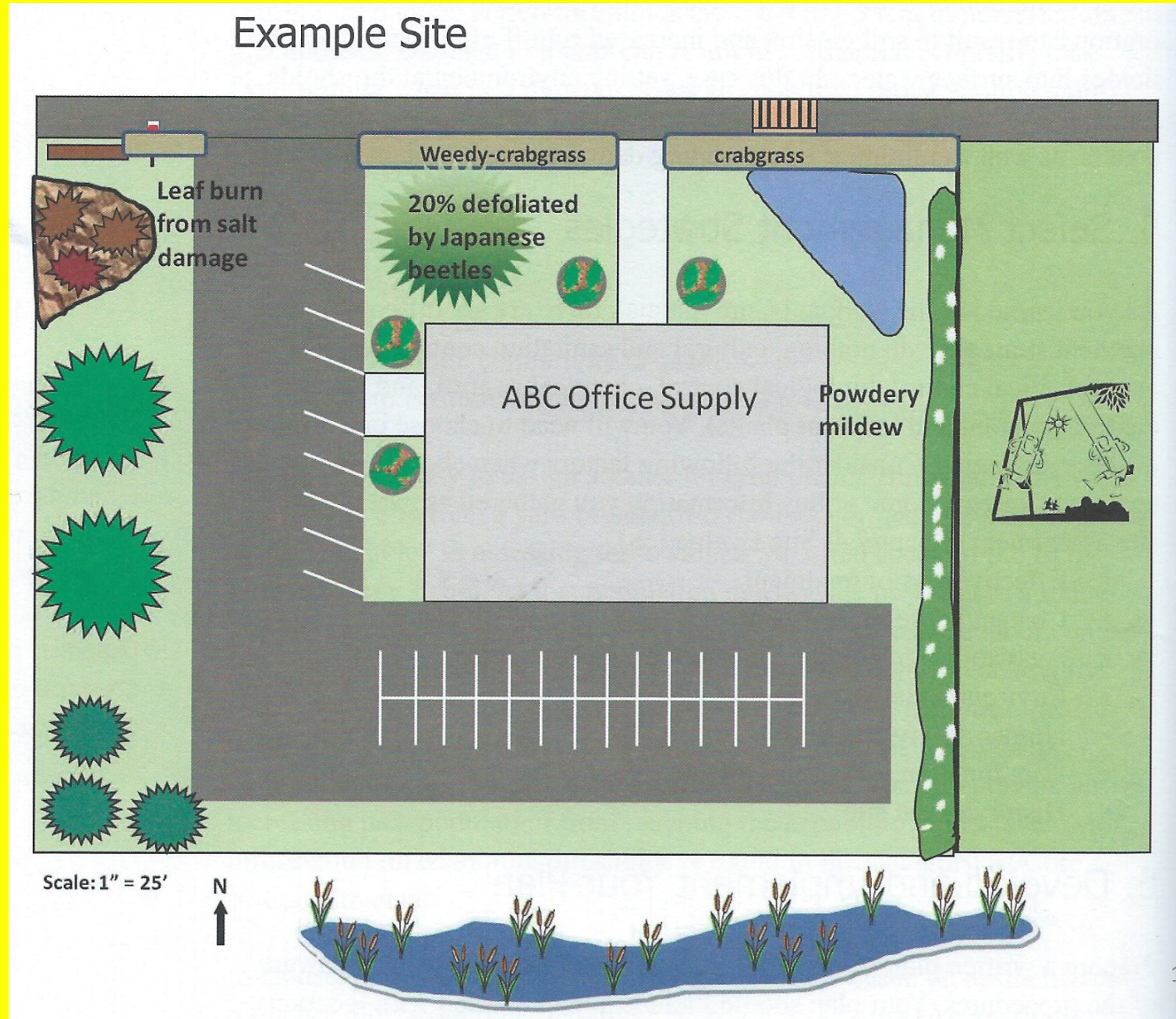
An effective IPM plan reduces harm to people, nontarget organisms, and to the environment.

When pest damage is equal to the cost of control what threshold has been reached?

The economic threshold

Integrated Pest Management Action Plan

IPM Example Landscape at ABC Office Supply



Integrated Pest Management Action Plan

IPM Examples

Problem crabgrass in turf

- Crabgrasses coarse-bladed, lighter-green grasses were found among the turfgrass.
- 'Do nothing' was not acceptable.

Integrated Pest Management Action Plan

IPM Example

Good cultural practices

- Mow high 2 ½ to 3 inches, remove no more than 1/3 of the blade.
- Irrigate for cool-season grasses. Deep and infrequent in spring and fall; shallow and more frequent in summer.
- Hand weeding may be practical for small patches but not if seeds have been produced.

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IPM Examples

Problem crabgrass in turf

- Crabgrass is best controlled with application of preemergent herbicides when soil temps have reached 55 degrees F and before crabgrass reaches its germination temperature of 57-64 degrees F. Use a soil thermometer.
- Corn gluten is an acceptable alternative to synthetic herbicide.

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IPM Examples

Problem crabgrass in turf

- At ABC Office Supply the crabgrass has already germinated, so post-emergence herbicide would be effective applied as a **spot spray**. A blanket application is not necessary.
- Any spills of herbicide on hard surfaces need to be cleaned up.

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IPM Examples

Problem in woody ornamentals, Japanese beetle on littleleaf linden



Littleleaf linden



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Integrated Pest Management Action Plan

IPM Examples

Problem woody ornamentals, Japanese beetle on linden

- ABC has a 13-inch DBH littleleaf linden as a featured tree.
- Options were limited to 'do nothing' or insecticide treatment. Defoliation would reduce aesthetic value but would probably not kill the tree.
- Treatment during flowering period could kill browsing pollinators.
- Honeybees are critical to nut, fruit, and vegetable pollination.

Integrated Pest Management Action Plan

IPM Examples

Problem woody ornamentals, Japanese beetles on littleleaf linden

- Reducing Japanese beetle populations in future years can be accomplished with annual applications of a biological control that targets the soil-resident grubs.
- Littleleaf linden will always be susceptible so consider replacement with a tolerant or resistant cultivar if treatments are too costly or only marginally effective.

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IPM Examples

Disease problem powdery mildew

- Largely aesthetic
- Before selecting the spray option consider pruning adjacent plantings to provide more sunlight and air circulation.



Powdery mildew on lilac

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IPM Examples

Disease problem powdery mildew

- IPM alternatives should be considered.
- Remove infected leaves at the end of the season to control disease spread.
- Consider resistant varieties.



Powdery mildew on bee balm

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IPM Examples

Abiotic problem, salt damage

- Deicing salt can cause injury to turf and landscape plants.
- Symptoms are often expressed in late summer or hot periods.
- Symptoms include: abnormal foliage color, leaf burns on margins, leaf drop, stunted growth, leaf necrosis, bud injury, smaller flowers.



Salt damage

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IPM Examples

Abiotic problem, salt damage

- The soil can be damaged from salt accumulation, increased compaction, negative impacts on plant growth, altered soil structure.
- Minimize salt use around landscape plants.
- Threshold would be aesthetic damage, measured by the amount of crop canopy impacted by symptoms.

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IPM Examples

Cultural practices

- **Avoid use of sodium chloride for de-icing, use calcium chloride or calcium magnesium acetate.**
- **Wait to apply de-icing compound until after shoveling snow or plowing over the root zones of salt-sensitive plants.**

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IPM Examples

Cultural practices

- Irrigate to leach-out sodium and chloride in the spring, flush with 2 inches of water over a 2-3 hour period.
- Apply organic matter to improve soil structure.
- Avoid salt accumulation by changing drainage patterns if necessary.

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IPM Examples

Cultural practices

- Replant with salt-tolerant plants e.g., junipers, mugo pines, chokeberry, red osier dogwood etc.
- Avoid use of deicing salt if possible.

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IPM Examples

Leafhoppers in nurseries

- Symptoms, distorted and yellowing leaves on some hawthorns and azaleas. Clusters of white spots on undersides of leaves.
- Physical control, removal of symptomatic plants or water jet spray to remove nymphs.
- Cultural control, avoid over-fertilization.



Leafhopper on azalea leaf

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Leafhoppers in nurseries

- Biological controls includes common predators e.g., damselflies, big eyed bugs, assassin bugs, and lacewings.
- There are some resistant plant species such as 'Autumn Blaze' maple.



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IPM Examples

Leafhoppers in nurseries

- **Damage is usually minimal, insecticidal soap spray will work in some instances.**
- **A systemic applied soil insecticide is an option, to protect new growth.**
- **Neem oil or pyrethrin can also be used.**
- **Scout with yellow sticky cards and for irregular spots on the underside of leaves.**

Short Summary

Applying pesticide treatment during a flowering period could kill the pollinators.

Crabgrass preemergent treatments need to be made when soil temperatures reach 55 degrees.

When crabgrass has germinated a post emergent spot sprays can be made instead of treating the entire turf.

Quick Questions

How do you identify crabgrass?

Crabgrass is coarse-bladed and lighter-green than turf grass.

What is the best mowing height for turfgrass?

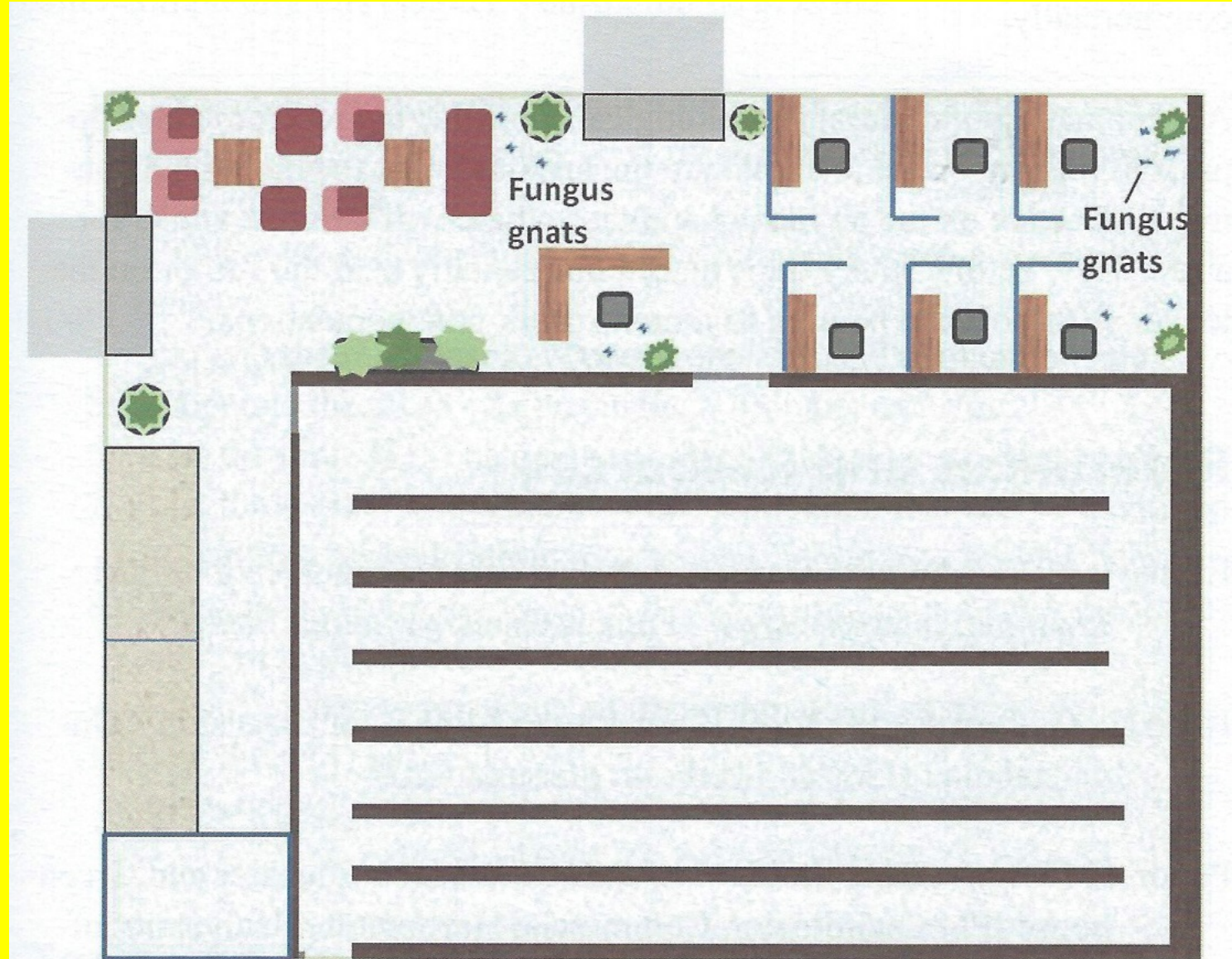
2 ½ to 3 inches

What is a cultural control for leafhoppers?

Avoid over fertilization.

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IPM Examples Interior of ABC Office Supply



Integrated Pest Management Action Plan

Fungus gnats on indoor plants

- Common pest of indoor plants
- Larvae feed on organic matter in the soil, such as peat moss.



Integrated Pest Management Action Plan

IPM Examples

Fungus gnats on indoor plants

- May feed on roots and provide entry point for diseases.
- Cultural controls are usually employed such as removal of standing water in pot trays.

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IPM Examples

Fungus gnats on indoor plants

- If fungus gnats are found remove decaying organic matter and upper ½ to 1 inch of soil where larvae may be present.
- Avoid overwatering.
- Prevent entry from open windows.

Integrated Pest Management Action Plan

IPM Examples

Fungus gnats on indoor plants

- Chemical control is usually not necessary but pyrethrin/pyrethroid insecticides can be used if necessary.
- Beneficial nematodes can be used, *Steinernema feltiae*.
- Monitor with yellow sticky tape.