

Lesson A5–8

Identifying and Managing Plant Pests in the Landscape

Unit A. Horticultural Science

Problem Area 5. Integrated Pest Management

Lesson 8. Identifying and Managing Plant Pests in the Landscape

New Mexico Content Standard:

Pathway Strand: Plant Systems

Standard: I: Apply principles of anatomy and physiology to produce and manage plants in both a domesticated and natural environment.

Benchmark: I-D: Develop and use a plan for integrated pest management.

Performance Standard: 1. Identify plant pests (e.g., insects, diseases, weeds, rodents). 2. Determine pest management safety practices. 3. Determine pest management methods. 4. Develop pest management plans based on pest life cycles.

Student Learning Objectives. Instruction in this lesson should result in students achieving the following objectives:

1. List the major destructive plant insects in the landscape.
2. Describe plant disease control techniques used in the landscape.
3. Name weed control techniques used in landscape beds.

List of Resources. The following resources may be useful in teaching this lesson:

Recommended Resources. One of the following resources should be selected to accompany the lesson:

Reiley, H. Edward and Carroll L. Shry, Jr. *Introductory Horticulture*, Sixth Edition. Albany, New York: Delmar Publishers, 2002.

Schroeder, Charles B., et al. *Introduction to Horticulture*, Third Edition. Danville, Illinois: Interstate Publishers, Inc., 2000.

Other Resources. The following resources will be useful to students and teachers:

Biondo, Ronald J. and Charles B. Schroeder. *Introduction to Landscaping: Design, Construction, and Maintenance*, Second Edition. Danville, Illinois: Interstate Publishers, Inc., 2003.

Ingels, Jack E. *Landscaping: Principles and Practices*, Fifth Edition. Albany, New York: Delmar Publishers, 1997.

List of Equipment, Tools, Supplies and Facilities

Writing surface

Overhead projector

Transparencies from attached masters

Terms. The following terms are presented in this lesson (shown in bold italics):

Chewing insects

Fungicides

Pre-emergent

Post-emergent

Sucking insects

Weed

Interest Approach. Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

Ask your students what would happen if you never changed the oil in your car. Or what if you never did any type of maintenance to your vehicle? After a few moments, tie the conversation about car maintenance to landscape maintenance. If you don't continually work to maintain your landscape, all of the hard work put in to building it would go to waste.

Summary of Content and Teaching Strategies

Objective 1: List the major destructive plant insects in the landscape.

Anticipated Problem: What are the major destructive plant insects in the landscape?

- I. Insects can severely injure or kill landscape plants. However, the damage is usually more of a nuisance than life threatening to the tree. Nature provides birds and other insects to control most plant damaging insects. Occasionally, people have interfered with this natural control process by importing insects into the United States from other parts of the world. If their natural enemies are not also imported, then an insect epidemic can develop. The two insect groups that cause the most damage to trees are:
 - A. **Chewing insects** injure trees by eating all or part of the leaves. Examples of this type of insect are caterpillars and bag worms. Under severe conditions they can eat all the leaves and thus defoliate the entire tree.
 - B. **Sucking insects** damage trees by sucking plant sap from the leaves. Examples of this type of insect are aphids, scale insects, and mites. Leaves damaged by sucking insects usually turn yellow. Using a magnifying lens can help in finding these very small insects.

A variety of techniques may be used to assist students in mastering this objective. Students should use text materials to help identify the major destructive plant insects in the landscape. Introduction to Horticulture is recommended. Use TM: A5–8A to assist in discussion on this topic.

Objective 2: Describe plant disease control techniques used in the landscape.

Anticipated Problem: What are plant disease control techniques used in the landscape?

- II. Landscapers can use several different disease control methods. Some of them are:
 - A. Planting disease resistant varieties of trees and shrubs—This can prevent many serious problems later on in the plant’s life. This is very important if in an area that is known to have a certain plant disease problem.
 - B. Pruning trees—Plants growing in dark, damp landscape locations are more susceptible to plant diseases development. Pruning can increase light penetration to the foliage and inhibit disease development. It can also improve air circulation around shrubs and reduce plant diseases.
 - C. Apply fungicides—**Fungicides** are chemicals that kill fungal organisms that attack plants. Be sure to read and follow all label directions when applying fungicides. Fungicides only provide temporary protection to the plant leaves. Reapply chemicals every two to three weeks during the growing season.

A variety of techniques may be used to assist students in mastering this objective. Students should use text materials to help identify plant disease control techniques used in the landscape. Introduction to Horticulture is recommended.

Objective 3: Name weed control techniques used in landscape beds.

Anticipated Problem: What are the weed control techniques used in landscape beds?

- III. A *weed* is any plant growing out of place or any unwanted plant. Weeds generally grow faster than desirable landscape plants because of a difference in their rate of photosynthesis. Weeds can destroy the beauty of the landscape and rob water and necessary nutrients from landscape plants. Weed growth can be controlled by using one of the following methods:
- A. Landscape fabric—woven plastic sheets are placed under the mulch material to prevent weed growth. These plastic sheets allow moisture and air to enter the soil, but do not allow plants to grow through them. The woven plastic sheets replaced solid black plastic sheets after it was found that the solid black plastic sheets caused poor plant growth due to reduced soil moisture and soil aeration. Holes are cut in the plastic sheet where the landscaper wants landscape plants to be planted and grow.
 - B. Mechanical control—This method involves weed control by hand pulling or hoeing. The landscape fabric cannot keep all weeds from germinating in the landscape. This is a very low cost and effective control method although it is very labor intensive.
 - C. Herbicides—This method involves the use of a group of chemicals that prevent weed germination or kill actively growing weeds. Herbicides can be divided into several major groups, depending on how and when they kill weeds. Two of the major groups are:
 - D. *Pre-emergent* herbicides are applied before the weed seeds germinate. This group of herbicides stops or prevents seed germination.
 - E. *Post-emergent* herbicides kill actively growing weeds. These chemicals require careful application to prevent the killing of desirable plants.

A variety of techniques may be used to assist students in mastering this objective. Students should use text materials to help identify weed control techniques used in the landscape. Introduction to Horticulture is recommended.

Review/Summary. Use the student learning objectives to summarize the lesson. Have students explain the content associated with each objective. Student responses can be used in determining which objectives need to be reviewed or taught from a different angle. Questions at the end of each chapter in the recommended textbooks may also be used in the review/summary

Application. Complete the “Pesticide Calculations” exercise *Introduction to Plant and Soil Science and Technology Activity Manual*.

Evaluation. Evaluation should focus on student achievement of the objectives for the lesson. Various techniques can be used, such as student performance on the application activity. A sample written test is attached.

Answers to Sample Test:

Part One: Matching

1=c; 2=f; 3=a; 4=b; 5=e; 6=d

Part Two: Completion

7. Woven, solid
8. Temporary
9. Pruning

Part Three: Short Answer

10. Use summary of content for Objective #1 in grading
11. Landscape Fabric, Mechanical Control, Herbicides

Test

Lesson A5–8: Identifying and Managing Plant Diseases in the Greenhouse

Part One: Matching

Instructions. Match the term with the correct response. Write the letter of the term by the definition.

- | | | |
|--------------------|--------------------|-----------------|
| a. chewing insects | b. fungicides | c. pre-emergent |
| d. post-emergent | e. sucking insects | f. weed |

- _____ 1. Herbicides which are applied before the weed seeds germinate. This group of herbicides stops or prevents seed germination.
- _____ 2. Any plant growing out of place or any unwanted plant.
- _____ 3. Injure trees by eating all or part of the leaves.
- _____ 4. Chemicals that kill fungal organisms that attack plants.
- _____ 5. Damage trees by sucking plant sap from the leaves.
- _____ 6. Herbicides kill actively growing weeds.

Part Two: Completion

Instructions. Provide the word or words to complete the following statements.

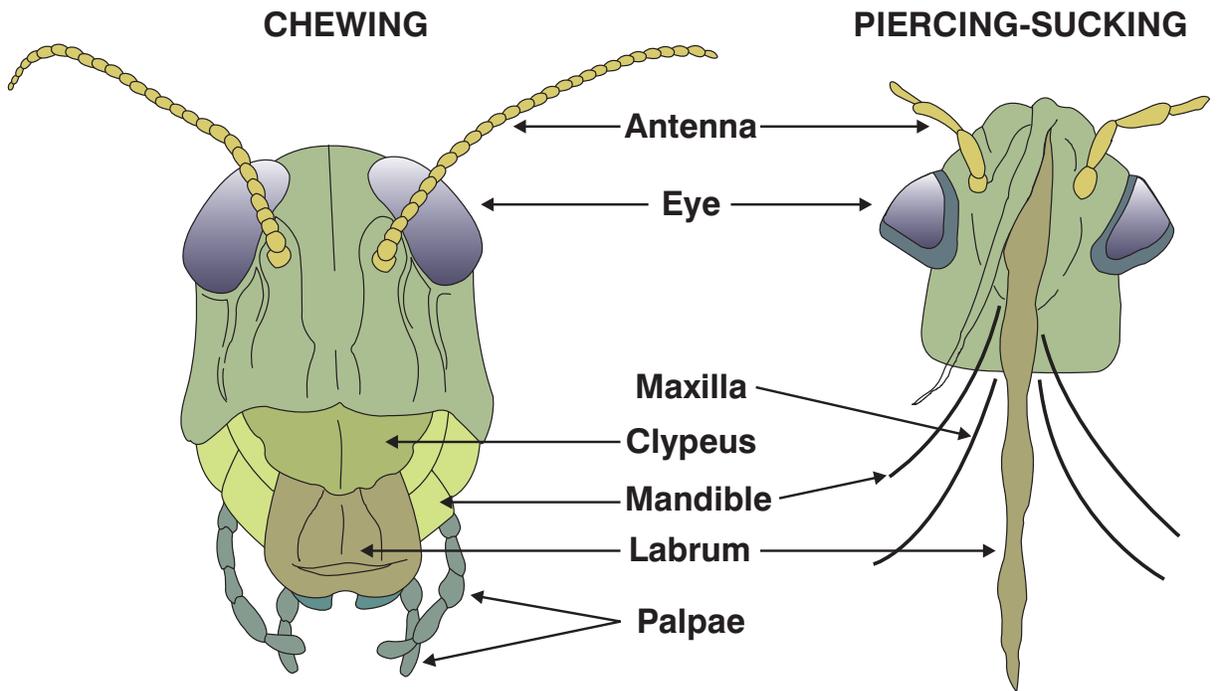
7. The _____ plastic sheets replaced _____ black plastic sheets after it was found to cause poor plant growth due to reduced soil moisture and soil aeration.
8. Fungicides only provide _____ protection to the plant leaves.
9. _____ can increase light penetration to the foliage and inhibit disease development.

Part Three: Short Answer

Instructions. Provide information to answer the following questions.

10. Name two examples of sucking insects and two examples of chewing insects.
11. Name three methods that can be used to control weeds in the landscape.

MOUTHPARTS OF CHEWING AND SUCKING INSECTS



(Courtesy, Interstate Publishers, Inc.)