

Module 8: Diagnosing Plant Problems

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Welcome to the Iowa Certified Nursery Professional Training program
Module 8: Diagnosing Plant Problems.

Module Objectives

1. Understand why accurate diagnosis of plant problems is important
2. Know the systematic method for diagnosing plant problems

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This module has 2 objects and upon completion you will be able to fulfill each of the objectives listed below.

1. Understand why accurate diagnosis of plant problems is important.
2. Know the systematic method for diagnosing plant problems.

Why diagnose?

- Accurate diagnosis of plant problems is necessary for effective management.
- Improper diagnosis may lead to wasted time and money, and the problem will continue.

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Diagnosing plant problems is one of the most important things you can do as a grower or landscaper. Accurate diagnosis of plant problems is necessary for effective management. Remember, diagnosing a plant problem improperly may lead to wasted time and money as ineffective management are used and a crop is damaged, and the problem may continue or get worse.

Systematic method

1. Identify the plant and know its characteristics.

- What is healthy?



Healthy: 'Taylor's sunburst' pine



Healthy: Hosta with dead center

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We use a systematic method to diagnose plant problems. The first step is to identify the plant and know its characteristics. Cultivars vary widely, and it's important to know what a particular plant is supposed to look like. For example, the pine cultivar 'Taylor's sunburst' shown on the left, normally produces new growth that is bright yellow. If we didn't know that this is normal for the plant, we might assume that the yellow growth is symptomatic of a disease. The hosta on the right is alive on the edges of the clump, but dead in the center. This is a normal, healthy growth pattern for this type of hosta and does not indicate a problem. It is important to know what a healthy plant should look like.

Systematic method

1. Identify the plant and know its characteristics.

- What problems are likely?



Mimosa webworm on locust



Pine wilt on Scots pine

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We also need to identify the plant in order to know what problems are commonly found on that kind of plant. Locust trees are especially susceptible to infestation by mimosa webworms, so properly identifying the tree helps us know what problems are likely. The pine tree on the right has died suddenly. Scots pines are very susceptible to a disease called pine wilt, but white pines are more resistant. Knowing whether the tree is a Scots pine or a white pine helps us know whether pine wilt is a likely possibility.

Systematic approach

2. Examine the entire plant, noting signs and symptoms.



Herbicide damage on pawpaw



Fungal canker on poplar

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The second step to diagnose a plant problem is to examine the entire plant, noting signs and symptoms. Plant problems are often first noticed on the leaves, but wilting or discoloration of leaves could indicate a problem with the stem or roots. Examine the leaves closely, but also examine the stem and branches, looking for abnormalities such as cankers, injuries, or galls.

Systematic approach

2. Examine the entire plant, noting signs and symptoms.



Planted too deep



Girdling roots

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Be sure to examine the base of the plant, especially if diagnosing a tree. Has it been planted properly? At the right depth? Can you see any injuries at the base of the plant, such as from an animal or lawn mower? Are there any girdling roots growing around the base?

Systematic approach

2. Examine the entire plant, noting signs and symptoms.



Browning of vascular tissue (caused by *Fusarium* wilt) on tomato



Root rot

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If possible, cut the plant open and look at its internal tissues. The tomato on the left has been split open, showing the water-conducting tissues (xylem) inside the stem. These tissues are brown, when normally they should be white. This discoloration is typically caused by a fungal wilt disease, in this case *Fusarium* wilt. If possible, examine the roots of the plant. This is easy when working with potted plants in a greenhouse. The roots on the plant on the right are brown and rotted, indicating a fungal root rot problem. When examining a sick plant, sometimes it is helpful to examine a healthy plant alongside it for comparison.

Systematic approach

3. Check the surrounding environment.



Plants too crowded, restricting airflow



Poor site conditions

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The third step in the systematic approach is to check the environment around the plant. Are there any patterns of affected plants, such as all the plants next to an air vent, or only the youngest plants? Is there adequate spacing between plants, to promote airflow? Is the plant growing in a stressful site, such as surrounded by concrete, with limited rootzone, or near a building? What is the soil like, and it is adequately drained? Are other nearby plants affected, or only one?

Systematic approach

4. Gather background information.



Damage from an ice storm



Construction equipment has run over the root zone of the tree.

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The fourth step is to gather as much background information about the situation as possible. When was the plant planted? When did the problem start, and how quickly have symptoms progressed? How is the plant cared for? For example, how often is it watered, how often fertilized, and have any pesticides been used recently? What has the weather been like recently? Especially for trees, find out if there have been any site changes, such as grade changes or major construction in the area in the last 10 years. When heavy construction equipment runs over the rootzone of a tree, the soil is compacted and the roots are inhibited, which may cause decline and death of the tree several years later.

Systematic approach

5. Know where to seek assistance.



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Sometimes, you will need more help to figure out a plant problem. Some plant problems cannot be accurately diagnosed without a microscope or other specialized lab tests. The Iowa State University Plant and Insect Diagnostic Clinic can help you diagnose plant problems and figure out appropriate management solutions. Contact them for more information on submitting samples for diagnosis.

Systematic approach

6. Synthesize your information, and don't be afraid to say "I don't know."
 - Ruling out possibilities is important
 - You may need to "wait and see"

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The final step in diagnosing a plant problem is to synthesize all the information you've gathered to come up with a reasonable diagnosis. Sometimes, you won't be able to come up with a final, definitive diagnosis. Never be afraid to say "I don't know". Remember, it is often just as valuable to rule out possibilities as to know for sure what happened. In some cases, you may need to wait and see what happens. A plant may grow out of its symptoms, or it may develop more symptoms later that give you a better clue to what's wrong. Diagnosing plant problems is often an ongoing, continual process.

That concludes this module.

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That concludes this module on diagnosing plant problems.