



**MASTER GARDENER**  
COLORADO STATE UNIVERSITY  
EXTENSION

## CMG GardenNotes #100

# Integrated Pest Management and the Diagnostic Process

## References and Review Material

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### Reading/Reference Materials

#### CSU GardenNotes

- <https://cmg.extension.colostate.edu/volunteer-information/cmg-gardennotes-class-handouts/>.
- #101, *IPM and Plant Health Care*.
- #102, *Diagnosing Plant Disorders*.
- #112, *Systemic Plant Evaluation*.
- #113, *Diagnosing Root and Soil Disorders on Landscape Trees*.
- #145, *Plant Growth Factors: Hormones*.
- #512, *Herbaceous Plants, Right Plant, Right Place*.

#### CSU Extension Fact Sheets

- <https://extension.colostate.edu/topic-areas/yard-garden/>.
- #2.903, *Nonchemical Disease Control*.
- #2.926, *Healthy Roots and Healthy Trees*.
- #2.932, *Environmental Disorders of Woody Plants*.
- #5.547, *Insect Control: Soaps and Detergents*.
- #7.402, *Perennial Gardening*.

#### Planttalk Colorado™

- <https://planttalk.colostate.edu/>.
- #1461, *IPM & PHC: What Are They?*

#### Other

- *Homeowner's Guide to: Pesticide Use Around the Home and Garden*, <https://extension.colostate.edu/docs/pubs/garden/xcm220.pdf>.
- *Homeowner's Guide to: Alternative Pesticide Management for the Lawn and Garden*, <https://extension.colostate.edu/docs/pubs/garden/xcm221.pdf>.
- High Plains Integrated Pest Management. Colorado State University, University of Wyoming, University of Nebraska, North Dakota State University, Montana State University, South Dakota State University, [https://wiki.bugwood.org/Main\\_Page](https://wiki.bugwood.org/Main_Page).
- University of California Agriculture and Natural Resources Statewide Integrated Pest Management Program, <https://ipm.ucanr.edu/>.
- Colorado Center for Sustainable Pest Management. Colorado State University College of Agricultural Sciences, <https://agsci.colostate.edu/agbio/ipm/>.

- The American Phytopathological Society (APS), <https://www.apsnet.org/Pages/default.aspx>.
- *Abiotic Disorders of Landscape Plants: A Diagnostic Guide*. University of California Agriculture and Natural Resources Publication 3420, 2004. ISBN: 1-879906-58-9.
- *Aspen: A Guide to Common Problems in Colorado*. Colorado State University Extension Publication 559A, 1996.
- *Insects and Diseases of Woody Plants of the Central Rockies*. Whitney Cranshaw, David Leatherman. CSU Extension, 2004. ISBN: 978-1889143040.
- *Plant Health Care for Woody Ornamentals*. University of Illinois Cooperative Extension, 1997. ISBN: 1-883097-17-7.

## Learning Objectives

At the end of this training, the student will be able to:

- Describe concepts of Integrated Pest Management, including the three basic elements of maintaining damaging insects/disease below thresholds, use of multiple, reinforcing tactics, and the conservation of environmental quality.
- Describe the concept of Plant Health Care (PHC) and how it relates to IPM.
- Distinguish between predisposing, inciting, and contributing factors affecting plant health.
- Outline the life cycle of trees and describe how trees need to change with stages in the life cycle.
- List steps in the diagnostic process.
- Using the diagnostic process, diagnose routine insect and disease problems of plants.

## Review Questions

### IPM, Plant Health Care, and Diagnosing Plant Disorder

1. Define IPM and PHC.
2. Describe concepts central to IPM.
3. Give examples of common IPM tools used in home gardening.
4. In pest management, what are *biocontrols*? What is the difference between conservation biocontrol and augmentation biocontrol?
5. What is the PIC cycle? What does it explain about tree care and pest problems?
6. In diagnosing contributing disorders, why is it important to also identify the predisposing and inciting factors to the extent possible?
7. Explain why it is important to define what is normal versus abnormal about a plant problem.
8. List the four steps in the diagnostic process.
9. Give examples of living (biotic) factors that cause plant problems. Give examples of non-living (abiotic) factors that cause plant problems.
10. Why is it important to correctly identify the plant being diagnosed?
11. Define *symptom* and *sign*. Give examples of each.
12. Define the following terms:
 

• Chlorosis.	• Canker.
• Blight.	• Gall.
• Dieback.	• Fruiting bodies.
• Decline.	• Mycelium.
• Leaf spot.	• Gummosis.
• Leaf scorch.	
13. List the five growth phases of landscape trees, giving growth objectives for each. What indicates that trees have changed their phase?
14. Why is it important to talk about tree care issues as they relate to growth phases?

## Diagnosing Tree Disorders

15. Explain how knowing the context of the situation helps in diagnosing the disorder.
16. Explain how painting a mental picture of a plant problem helps in diagnosing a disorder.
17. Explain how repeating back the details in your own words helps in diagnosing a disorder.
18. Explain how to tactfully change directions when the evidence leads down another road.
19. Why is it important to discuss management options only after the problems have been diagnosed?
20. List the four steps in the diagnostic process.
21. List steps for systematically evaluating a tree.
22. In the landscape setting, what is the universal limiting factor for root growth?
23. Describe the typical rooting system of a tree. Describe location and function of the following root types:
  - Root plate or zone of rapid taper.
  - Transport roots.
  - Feeder roots.
  - Sinker roots.
  - Tap root.
10. What two factors play into the rooting depth and spread?
11. What is the typical depth and spread of tree roots? How does this change for compacted/clayey soils?
12. Explain how to calculate the Critical Rooting Radius *and Tree Protection Zone (Protected Root Zone)*.
13. Describe how potential rooting spread impacts tree growth and vigor. What happens when a tree's root system cannot spread as needed?
14. Describe techniques to evaluate soil/root disorders and soil compaction.
15. Describe worthwhile techniques to reduce soil compaction around trees. Explain why questionable techniques to reduce soil compaction are out of favor.
16. What single factor accounts for the most deaths of landscape trees? What causes trunk-girdling roots? How long after planting can trunk-girdling root develop? What can be done for a tree with trunk girdling roots?
17. Describe how a tree balances root growth with canopy growth.
18. List the PHC questions for using pesticides.