



for new farmers

## Diagnosing a Plant Problem 101

**S**omething is wrong with your plant. What is the cause? Don't assume you know the answer and accidentally treat for the wrong problem. Use this step-by-step method to narrow down the possibilities, but don't forget to ask the experts, if you need to.

There can be numerous causes for plant symptoms. Not all symptoms are related to insects or plant diseases. Plant health may be affected by soil fertility and texture, weather conditions, quantity of light, and other environmental and cultural conditions, as well as animals, including humans. In addition, complexes can develop from interactions between two or more of these factors.

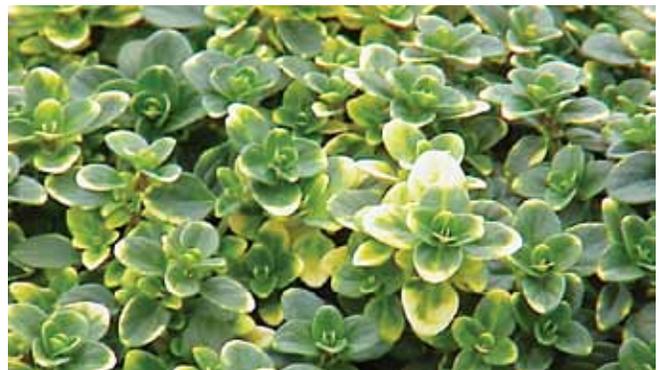
Unlike Sherlock Holmes mysteries, the possibilities are generally not unlimited. However, it will take your observational skills and deductive logic to help solve the mystery.

Keep in mind that this is a skill that takes time to develop and that it is always best to verify your conclusions by bringing a sample to your local extension office or by sending a sample to your local plant diagnostic clinic. Penn State offers this service for free (except commercial turf samples). Take advantage

of it. For a listing of local extension offices, visit [extension.psu.edu/counties](http://extension.psu.edu/counties). For the plant diagnostic clinic address information, go to [plantpath.psu.edu/facilities/plant-disease-clinic](http://plantpath.psu.edu/facilities/plant-disease-clinic).

### **KNOW THE PLANT'S NORMAL APPEARANCE**

You have to know what the plant is supposed to look like before you can know that something is wrong. For example, some plants have variegated foliage or are yellow green. They are not diseased; they are supposed to look that way. (See example variegated thyme.)



**Don't be fooled. Plants like this variegated thyme may look sick even when they are not.**

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### CONSULT LITERATURE RESOURCES FOR POSSIBLE DISEASES AND DISORDERS

Many resources may list common pathogens and disorders for different types of plants. Review a resource that is specific to your geographic area. You are unlikely to have a plant disease that is only found in Florida in your market garden in Pennsylvania. Some good resources include Cornell University's *Organic Production Guides* ([www.nysipm.cornell.edu/organic\\_guide](http://www.nysipm.cornell.edu/organic_guide)) for a listing of common problems in the Northeast by crop and the *Northeast Vegetable and Strawberry Pest Identification Guide* and *Identifying Diseases of Vegetables* for pictures. Learning potential problems commonly associated with a particular crop beforehand will be beneficial during the busy growing season.

### INVESTIGATE SYMPTOM PROGRESSION

You want to know if the problem is a result of a living (biotic) or nonliving (abiotic) factor. Usually biotic diseases spread throughout the plant and from plant to plant as the pathogen reproduces and attacks new tissue. Abiotic problems tend not to spread this way.



**Ozone damage in pumpkins.** The problem did not get progressively worse, suggesting an abiotic culprit. Photo courtesy of B. Gugino, Penn State.

### ASK QUESTIONS

Ask questions (similar to those a doctor would ask you):

1. When was the problem noticed?
2. Was the damage sudden or gradual?
3. How old are the affected plants?
4. What percentage of the plant is affected?
5. How severe is the injury?

### OBSERVE PATTERNS

Is a large area affected or just scattered plants? Check to see whether the distribution pattern is uniform or random. Are the symptoms first observed in one field corner or along a field edge or are they associated with the lowest or highest areas of the field? Uniform distribution, especially across different plant types, usually suggests an abiotic problem, but it could also indicate seedborne or transplant problems.

### REVIEW YOUR CULTURAL PRACTICES

Sometimes what we think is a disease is really a problem related to irrigation or fertility practices. Overfertilization or overwatering causes problems as often as underfertilization or underwatering. Also consider the soil conditions and field cropping and/or pesticide application history.

### CONSIDER POSSIBLE ENVIRONMENTAL CAUSES

1. Temperature extremes
2. Drought or excess rain
3. Soil types and conditions



**Chilling injury in corn.** The most stressful condition for germinating corn seeds is exposure to cold (< 50°F), wet conditions immediately following planting. When the seed takes in cold water, that reduces the elasticity of the cellular membranes of the developing seedling. This can cause cell rupture and leakage, which can release sugars and promote fungal and insect damage to the seed. Photo courtesy of Greg Roth, Penn State.

### CHECK HOST SPECIFICITY

Are the symptoms present on just one species or variety of plant? If plants from many different families were affected, such as lettuce, tomatoes, flowers and turnips, then it is more likely to be an abiotic problem.

### CHECK FOR SIGNS AND SYMPTOMS

Check for signs and symptoms of plant pathogens and diseases. Signs are the actual plant pathogen visible on the symptomatic plant—for example, masses of powdery mildew spores. Symptoms are changes in the appearance of the plant in response to infection by the pathogen (e.g., wilting or chlorosis). Go back to your resources and try to solve the puzzle.



Early blight signs and symptoms (target-shaped lesion = sign) typically start on leaves closest to the soil, indicating that the pathogen spreads from crop debris in the soil. Photo courtesy of B. Gugino, Penn State.

### REFERENCES

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This publication was supported in part by funding from the Beginning Farmer and Rancher Development Program of the National Institute of Food and Agriculture, USDA, Grant #2009-49400-05869.

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An OUTREACH program of the College of Agricultural Sciences

**Penn State College of Agricultural Sciences research and extension programs are funded in part by Pennsylvania counties, the Commonwealth of Pennsylvania, and the U.S. Department of Agriculture.**

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Produced by Ag Communications and Marketing

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**CODE # EE0033** 5M6/12payne5131



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