DIAGNOSING LANDSCAPE & GARDEN PROBLEMS

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HANDOUTS

- Outline
- Plant Disease Diagnosis
- Diagnosing Problems Caused by Insects/Mites
- Techniques for Diagnosing Plant Problems

- Refer to Chapter 22, “Diagnosing Plant Problems”

INTRODUCTION

- The Plan
  - Take you through exercises
  - Short lecture
  - “Hands-on” plant clinic
- Aimed at teaching you **HOW TO APPROACH A PLANT PROBLEM IN ORDER TO DIAGNOSE THE CAUSE**
- Focus on the **PROCESS of DIAGNOSIS & DEVELOPING OBSERVATION SKILLS**
- The Goal
  - You will have some idea what to do when you get your first call as a MG & are asked to diagnose a plant problem
  - You will look at plants a little differently & more carefully than you did before

THE DIAGNOSTIC PROCESS

- First Part of Lecture
  - Focus on **"Process of Diagnosis"**
- Second Part of Lecture
  - Focus on **"Symptom Recognition"**

This will tie together some of the previous lectures

First Call!

- **Client**
  - "My orange tree has bugs that are killing it"
- **Master Gardener – What are you going to do?**
  - A. Panic
  - B. Run into your Farm Advisor's office
  - C. Ask the client questions
  - D. Tell the client you are sorry, but don't know anything about bugs or orange trees

PLANT SAMPLE EXERCISE
(5 minutes – work in pairs)

IMAGINE IT'S YOUR FIRST DAY,
A client comes in with a sample
"what is wrong with my plant?"

1-Write down a description of the symptoms you see
2-Write down any questions you need to ask to diagnose the problem

DIAGNOSTIC SKILLS

- **HOW TO APPROACH THE PROBLEM TO DIAGNOSE THE CAUSE**
  - When a plant is subjected to unfavorable growing conditions compared to plants growing under more normal conditions, certain **SYMPTOMS** become evident.
  - This is what will prompt the homeowner to call you

WHAT IS WRONG WITH MY PLANTS ?
WHAT HAPPENED ?

HOW ARE YOU GOING TO HELP THIS PERSON?

These are the skills we'll start to develop today

HOW TO APPROACH DIAGNOSIS

ASK YOURSELF

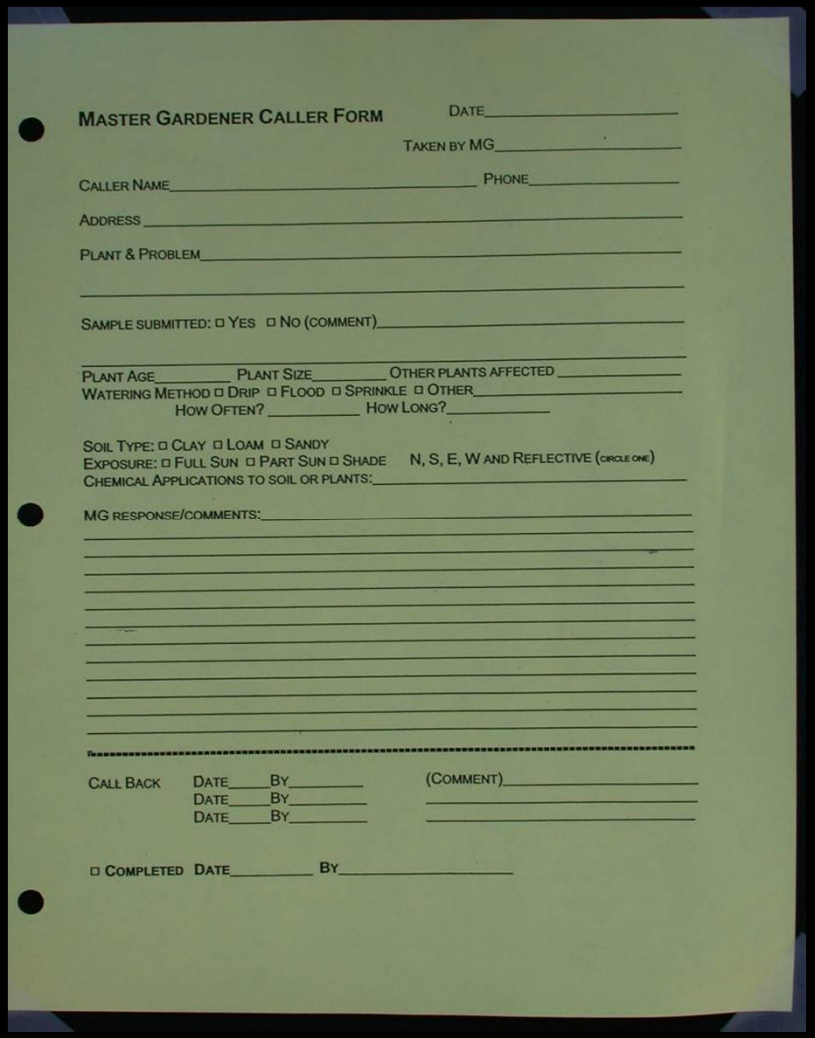
- WHAT DO I NEED TO KNOW?
- WHAT EQUIPMENT DO I NEED?
- WHAT TYPE OF OBSERVATIONS SHOULD I MAKE?
- WHAT QUESTIONS DO I HAVE TO ASK?
- WHAT CAN I DEDUCE FROM DIFFERENT SYMPTOM TYPES?

- YOU CAN OFTEN DISTINGUISH BETWEEN DIFFERENT PROBLEMS BY LEARNING TO RECOGNIZE DIFFERENT SYMPTOM TYPES

EQUIPMENT/TOOLS NEEDED

- POCKET KNIFE
- HAND LENS
- PLASTIC BAGS
- PROBLEM WORKSHEET or NOTEBOOK
- SHOVEL
- CAMERA
- DISSECTING SCOPE (OFFICE)

PROBLEM WORKSHEET



MASTER GARDENER CALLER FORM DATE_____

TAKEN BY MG_____

CALLER NAME_____ PHONE_____

ADDRESS_____

PLANT & PROBLEM_____

_____

SAMPLE SUBMITTED: □ YES □ NO (COMMENT)_____

_____

PLANT AGE_____ PLANT SIZE_____ OTHER PLANTS AFFECTED _____

WATERING METHOD □ DRIP □ FLOOD □ SPRINKLE □ OTHER_____

HOW OFTEN? _____ HOW LONG?_____

SOIL TYPE: □ CLAY □ LOAM □ SANDY

EXPOSURE: □ FULL SUN □ PART SUN □ SHADE N, S, E, W AND REFLECTIVE (CIRCLE ONE)

CHEMICAL APPLICATIONS TO SOIL OR PLANTS:_____

MG RESPONSE/COMMENTS:_____

CALL BACK DATE____BY_____ (COMMENT)_____

DATE____BY_____ _____

DATE____BY_____ _____

□ COMPLETED DATE_____ BY_____

- HELPFUL TO HAVE CLIENT FILL THIS OUT
- USE TO ASK QUESTIONS FROM & COLLECT PERTINET INFORMATION
- WHO ASKED "WHAT KIND OF PLANT?" DURING EXERCISE?

Questions To Ask

- Very important to get background information to begin narrowing down the problem.
- Remember the client at beginning of program "My orange tree has bugs that are killing it"
  - Can you see the bugs? If so, what do they look like? Color, size, etc.
  - Are they on the twigs, leaves, etc.?
  - What are the symptoms – holes or stippling on leaves, How many orange trees have these bugs?
  - branch dieback, etc.?
  - Please bring a sample showing symptoms and bugs into the office for I.D. for a tentative diagnosis.

CLIENT – “MY TREE IS DYING”

MG – “WHAT KIND OF TREE?”

“WHERE IS THE TREE GROWING?”

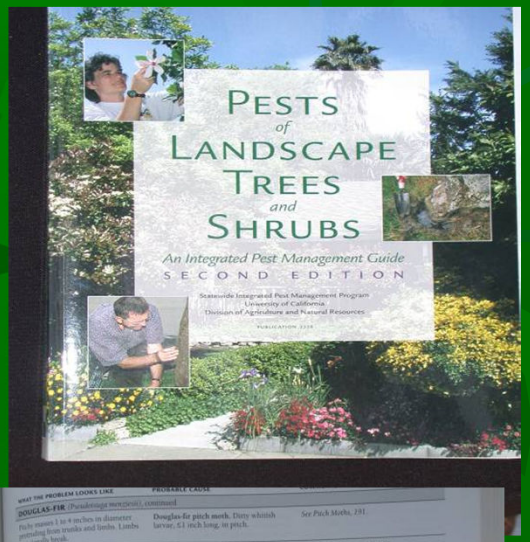
“WHAT ARE THE SYMPTOMS?”

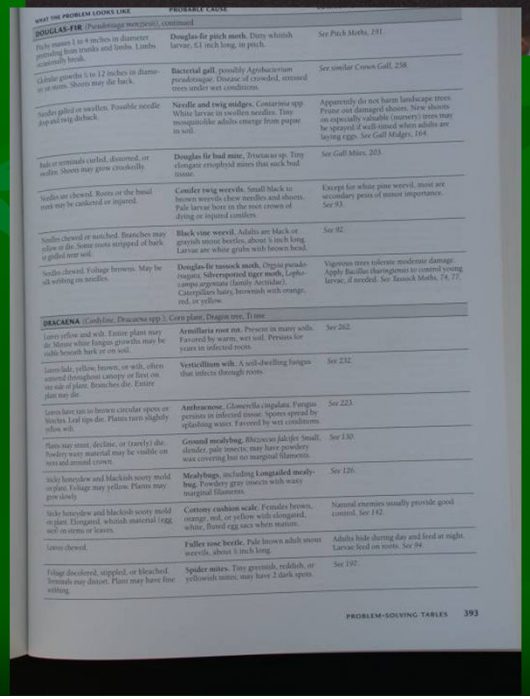
“WHERE ON THE TREE DO YOU SEE THE SYMPTOMS?”

WHAT DO I NEED TO KNOW

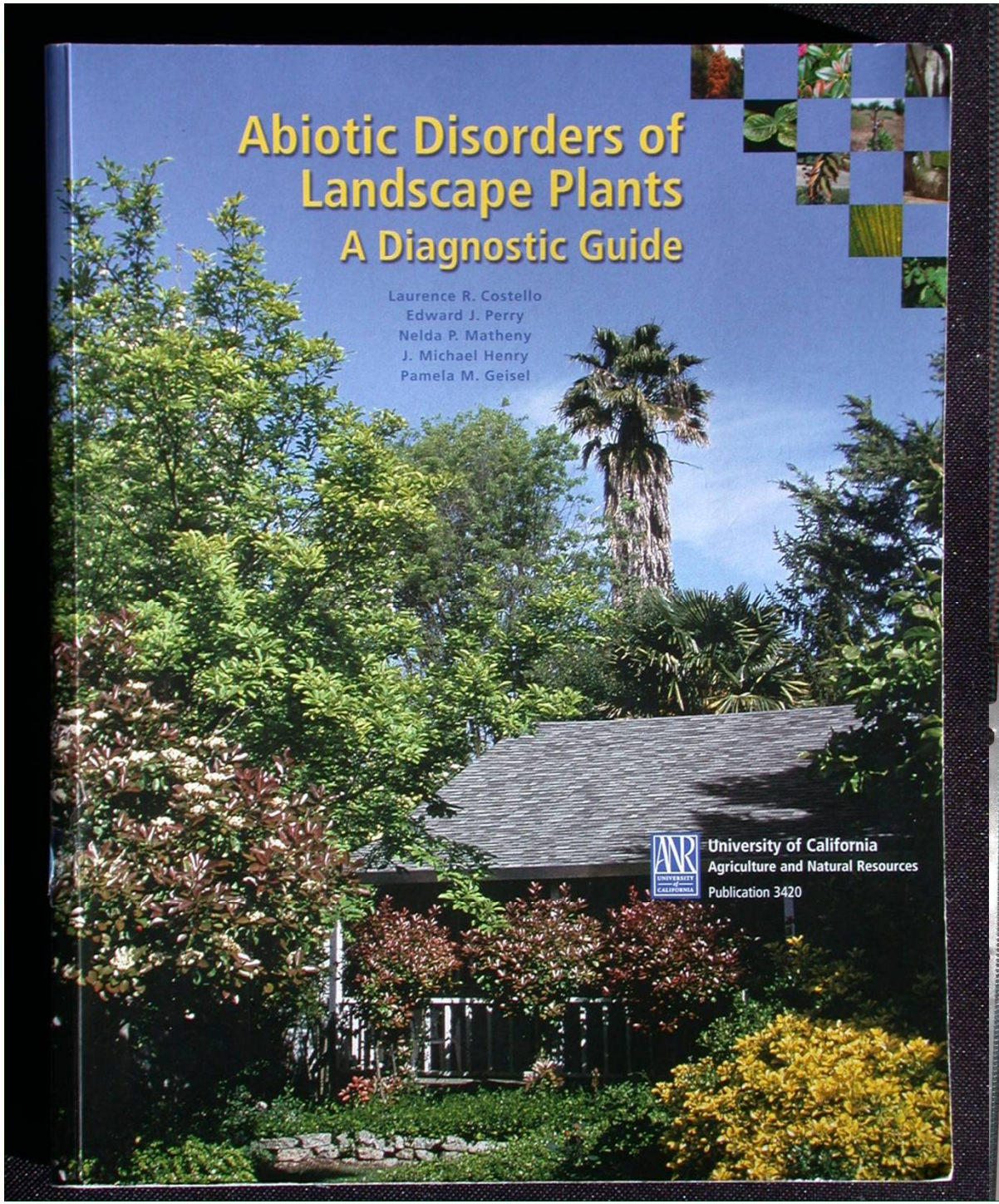
- THE DISEASES AND INSECTS REPORTED ON THE HOST PLANT
- THE DISEASES AND INSECTS MOST PREVALENT IN THIS AREA AND FACTORS AFFECTING THEIR DEVELOPMENT

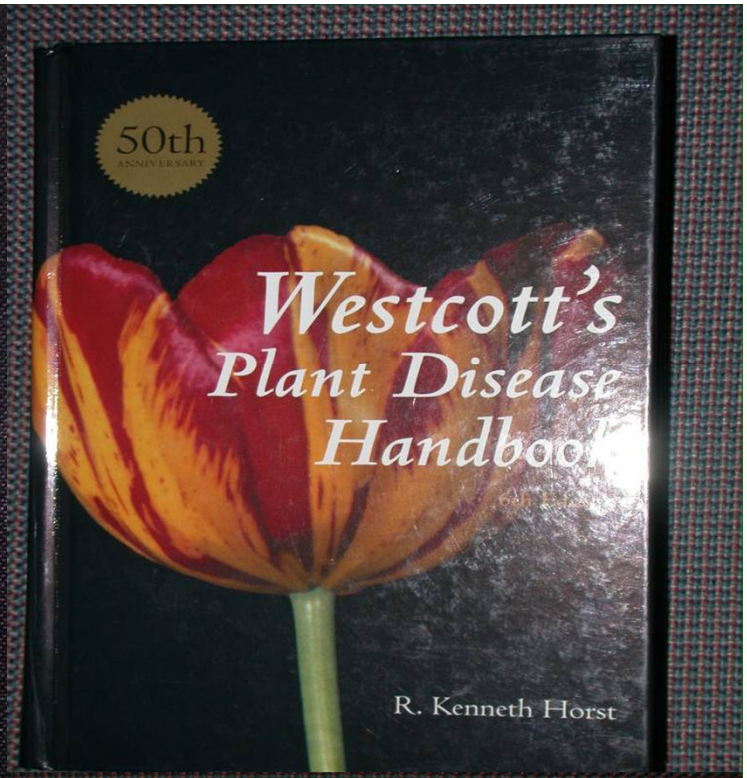
REFERENCE BOOKS

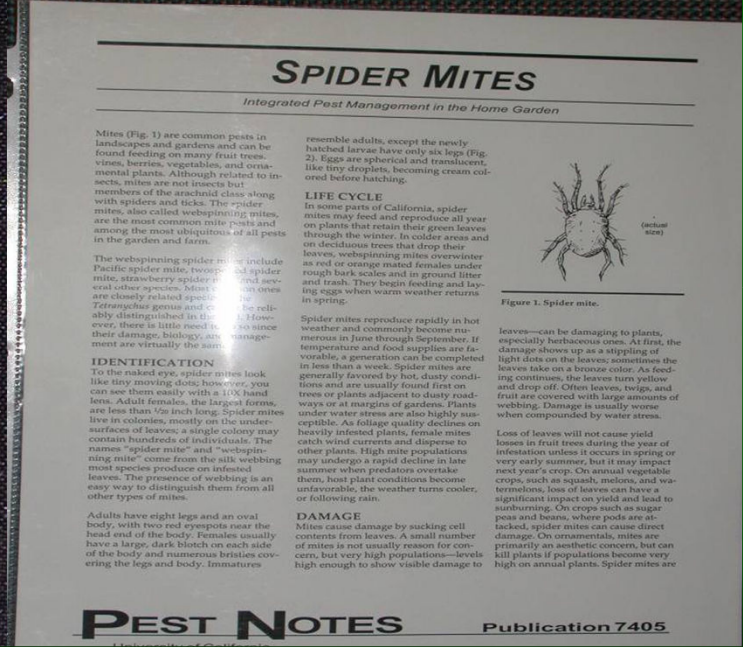




- A Must!
- What common diseases and insects are reported on host plant in your area?
- Know where to look for diseases or insects reported on plant
- Great problem solving tables







SPIDER MITES

Integrated Pest Management in the Home Garden

Mites (Fig. 1) are common pests in landscapes and gardens and can be found feeding on many fruit trees, vines, berries, vegetables, and ornamental plants. Although related to insects, mites are not insects but members of the arachnid class along with spiders and ticks. The spider mites, also called webspinning mites, are the most common mite pests and among the most ubiquitous of all pests in the garden and farm.

The webspinning spider mites include Pacific spider mite, two-spotted spider mite, strawberry spider mite, and several other species. Most of them are closely related species in the *Tetranychus* genus and can be reliably distinguished in the field. However, there is little need to do so since their damage, biology, and management are virtually the same.

IDENTIFICATION

To the naked eye, spider mites look like tiny moving dots; however, you can see them easily with a 10X hand lens. Adult females, the largest forms, are less than 1/50 inch long. Spider mites live in colonies, mostly on the undersurfaces of leaves; a single colony may contain hundreds of individuals. The names "spider mite" and "webspinning mite" come from the silk webbing most species produce on infested leaves. The presence of webbing is an easy way to distinguish them from all other types of mites.

Adults have eight legs and an oval body, with two red eyespots near the head end of the body. Females usually have a large, dark blotch on each side of the body and numerous bristles covering the legs and body. Immatures resemble adults, except the newly hatched larvae have only six legs (Fig. 2). Eggs are spherical and translucent, like tiny droplets, becoming cream colored before hatching.

LIFE CYCLE

In some parts of California, spider mites may feed and reproduce all year on plants that retain their green leaves through the winter. In colder areas and on deciduous trees that drop their leaves, webspinning mites overwinter as red or orange mated females under rough bark scales and in ground litter and trash. They begin feeding and laying eggs when warm weather returns in spring.

Spider mites reproduce rapidly in hot weather and commonly become numerous in June through September. If temperature and food supplies are favorable, a generation can be completed in less than a week. Spider mites are generally favored by hot, dusty conditions and are usually found first on trees or plants adjacent to dusty roadways or at margins of gardens. Plants under water stress are also highly susceptible. As foliage quality declines on heavily infested plants, female mites catch wind currents and disperse to other plants. High mite populations may undergo a rapid decline in late summer when predators overtake them, host plant conditions become unfavorable, the weather turns cooler, or following rain.

DAMAGE

Mites cause damage by sucking cell contents from leaves. A small number of mites is not usually reason for concern, but very high populations—levels high enough to show visible damage to leaves—can be damaging to plants, especially herbaceous ones. At first, the damage shows up as a stippling of light dots on the leaves; sometimes the leaves take on a bronze color. As feeding continues, the leaves turn yellow and drop off. Often leaves, twigs, and fruit are covered with large amounts of webbing. Damage is usually worse when compounded by water stress.

Figure 1. Spider mite.

Loss of leaves will not cause yield losses in fruit trees during the year of infestation unless it occurs in spring or very early summer, but it may impact next year's crop. On annual vegetable crops, such as squash, melons, and watermelons, loss of leaves can have a significant impact on yield and lead to sunburning. On crops such as sugar peas and beans, where pods are attacked, spider mites can cause direct damage. On ornamentals, mites are primarily an aesthetic concern, but can kill plants if populations become very high on annual plants. Spider mites are

PEST NOTES Publication 7405

USEFUL WEBSITES

- **UC IPM WEBSITE**
  - **MANAGING HOME GARDEN PESTS**
  - http://ipm.ucdavis.edu/PMG/menu.homegarden.html
- **UC DAVIS FRUIT AND NUT CENTER**
  - **THE BACKYARD ORCHARD**
  - http://fruitsandnuts.ucdavis.edu
- **ANR CATALOG**
  - PEST NOTES, 8000 SERIES
    - http://anrcatalog.ucdavis.edu/

CONFIRM or ELIMINATE

- **THE MOST OBVIOUS POSSIBLE CAUSES**
- Takes Experience!
- Decide if it's Insect, Disease, Abiotic, Man Caused - Chemical

Are Symptoms…?

GENERALIZED

VS.

LOCALIZED

What Plant Parts Are Affected?

- Most insects and diseases affect only certain parts of the plant.
- This will help in diagnosing
- Often will get samples of only above ground symptoms, but problem will be in roots.
- The diagnostician must **FIND THE SITE OF PRIMARY INJURY.** This is the challenge!
- Client must bring in large enough & representative samples.

- **SOME ADVICE...**

- **Often will be asked to determine the cause by a description given over the phone**

- **BE CAUTIOUS**

- When providing advice, unless you have a representative sample in front of you.

HANDLING SAMPLES

- Handle carefully!
  - Don’t shake them
  - Don’t destroy the symptoms or signs
    - E.g. – don’t rub off the fungal spores of powdery mildew
  - Cut into the boundary margin between healthy and affected tissue to look for canker margins
  - Keep fresh in plastic bags in the refrigerator for later inspection

QUESTIONS to ASK CLIENT and YOURSELF

- What kind of plant has the problem?
- What are the diseases, insects and abiotic problems reported on the plant?
- What are the common insects and diseases in the area?
- What is the distribution of problem in yard?
- What was the weather before symptoms appeared or were seen?
- What plant parts are affected?
- What is the site of the primary injury?
- What are the symptoms?

SYMPTOMS ARE A GUIDE TO THE CAUSE

To help us diagnose the cause,

We need to develop skills in recognizing symptoms

Recognizing Symptoms
Audience Participation Exercise

- We are going to get you looking at plants and symptoms more carefully.
- Go around the room and describe the symptoms you see.
- Do not identify the plant or try to diagnose the cause.
- Look at the slide and describe what you see.
- The rest, listen carefully, these are the kinds of descriptions you will hear on the phone

THESE ARE SYMPTOMS

- We have been looking at symptoms
- These are **A GUIDE TO THE CAUSE**
  - Before giving a recommendation to manage or control a yard problem
    - WE MUST DIAGNOSE PROBLEM CORRECTLY
- We must **FIND THE CAUSE** to why the plant is responding with these symptoms.
  - (We will return to these slides after we discuss causes)

NEXT PART OF LECTURE

- Review main causes of landscape plant problems
- Define **SYMPTOM TYPES** you are likely to find in the field
- **The Purpose Today Is To Start Associating Certain Symptoms With Certain Causes**
- (not going into detail nor discussing control)

CAUSES of PLANT DISEASE

- PARASITIC
  - Fungi
  - Bacteria
  - Viruses
  - Phytoplasma
  - Nematodes
  - Parasitic Plants
  - (Insects & Mites too!)

- NON-PARASITIC
  - Soil moisture or temperature extremes
  - Air temperature extremes
  - Mineral extremes
  - Air pollution
  - Wind, light effects
  - Soil structure
  - Mechanical damage
  - Pesticide damage

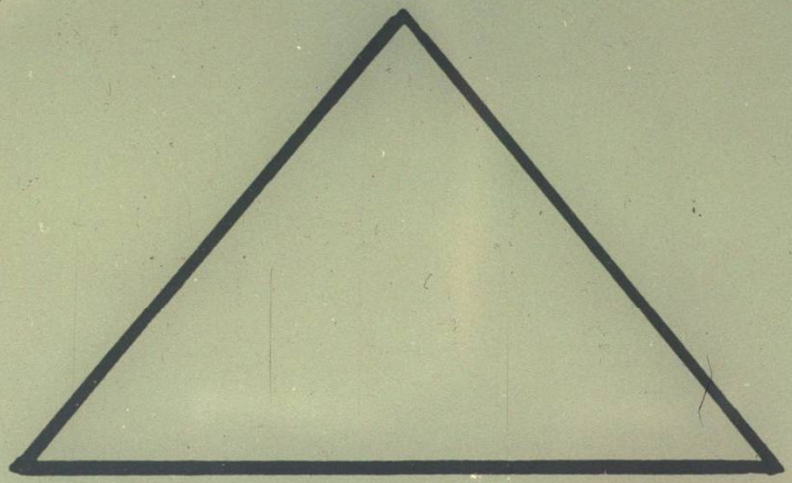
Non-parasitic (Abiotic) Plant Diseases

- Caused by adverse environmental conditions
- Often the result of human activity
- Abiotic disorders can predispose plants to attack by insects and pathogens

- EXCESS OR LACK OF SOMETHING THAT SUPPORTS LIFE

PARASITIC or INFECTIOUS PLANT DISEASES

PLANT



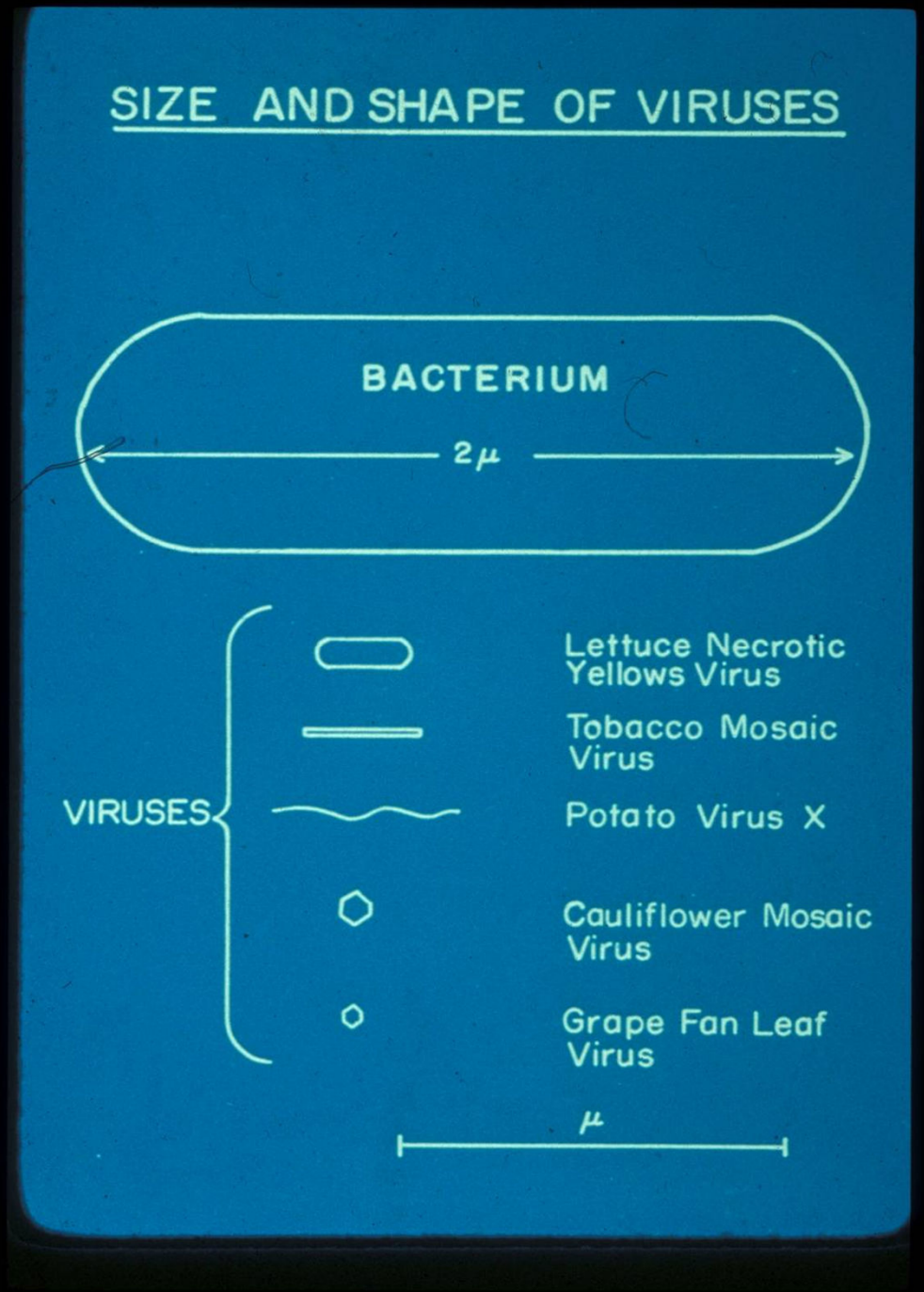
ENVIRONMENT

PATHOGEN

VIRUS DISEASES

VIRUS DISEASES

- VIRUSES and VIROIDS are the SMALLEST KNOWN ORGANISMS
  - Capable of being transmitted from plant to plant
  - Can only be observed with an electron microscope
  - Detected using PCR's
  - Structurally simple
  - Rely on their host plant's living cells to replicate


SIZE AND SHAPE OF VIRUSES
BACTERIUM
2μ
VIRUSES
Lettuce Necrotic Yellows Virus
Tobacco Mosaic Virus
Potato Virus X
Cauliflower Mosaic Virus
Grape Fan Leaf Virus
μ

SYMPTOMS

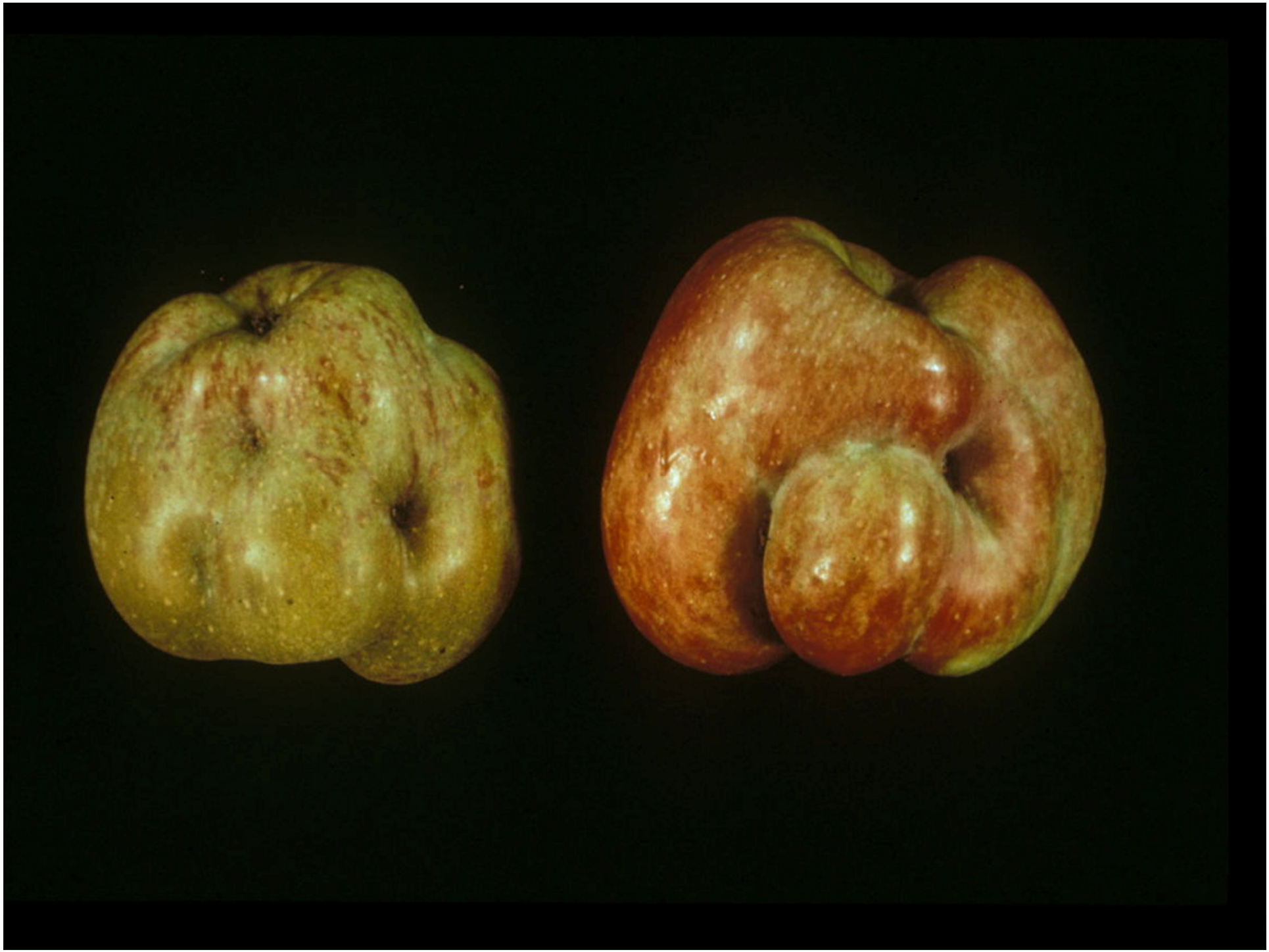
GROWTH REDUCTIONS

SYMPTOMS

COLOR CHANGES

SYMPTOMS

MALFORMATIONS



SYMPTOM

NECROSIS (DEATH)

PLANT DISEASES

CAUSED BY

BACTERIA

MOST COMMON SYMPTOMS

- GALLS
- LEAF SPOTS
- SYSTEMIC SYMPTOMS

SYMPTOM

GALLS
SWELLING or OVERGROWTH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SYMPTOM

LEAF SPOTS

Usually Angular with

Water Soaked Lesions

SYMPTOM

SYSTEMIC


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FIREBLIGHT

Plant Diseases Caused by Fungi

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