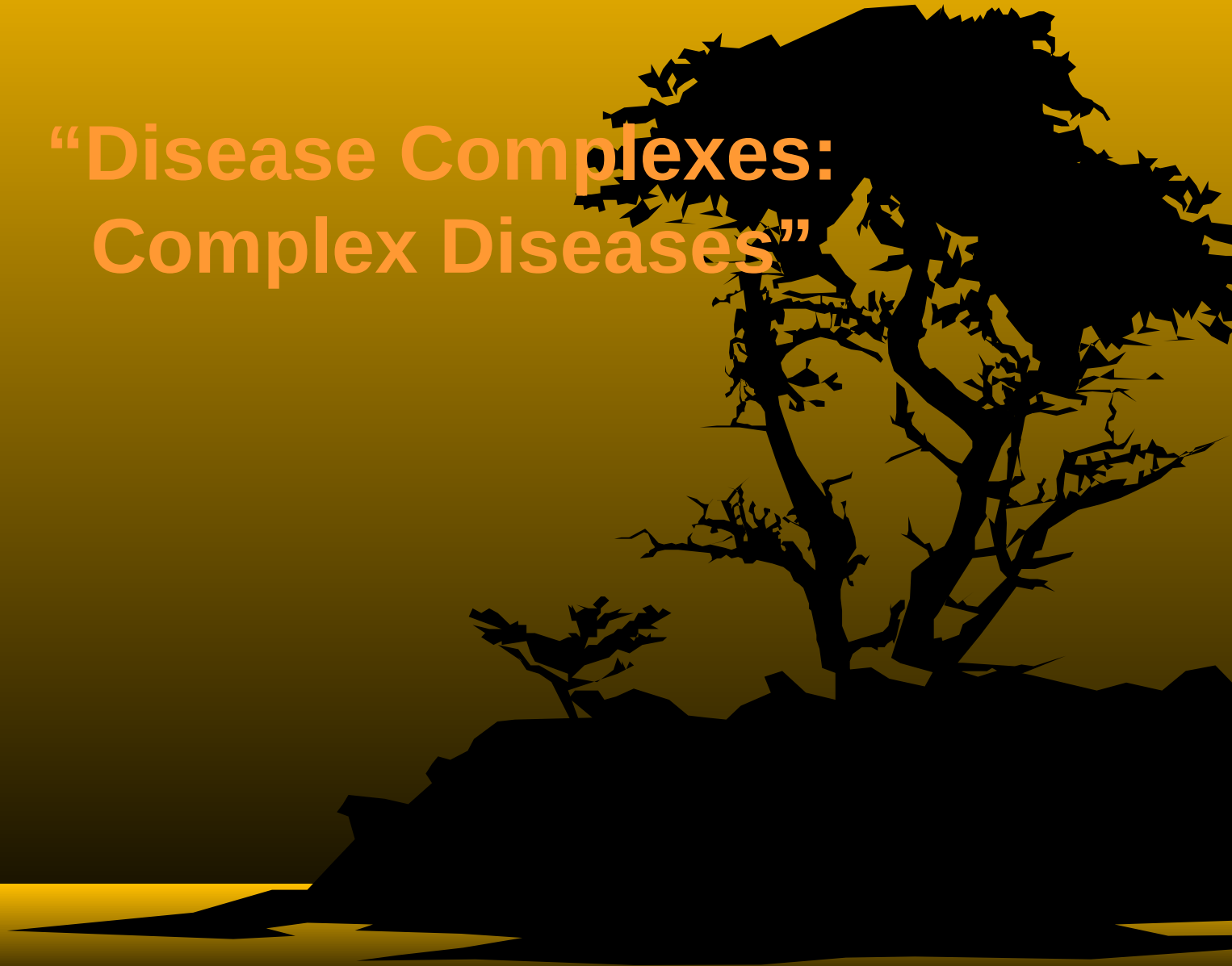



“Disease Complexes: Complex Diseases”



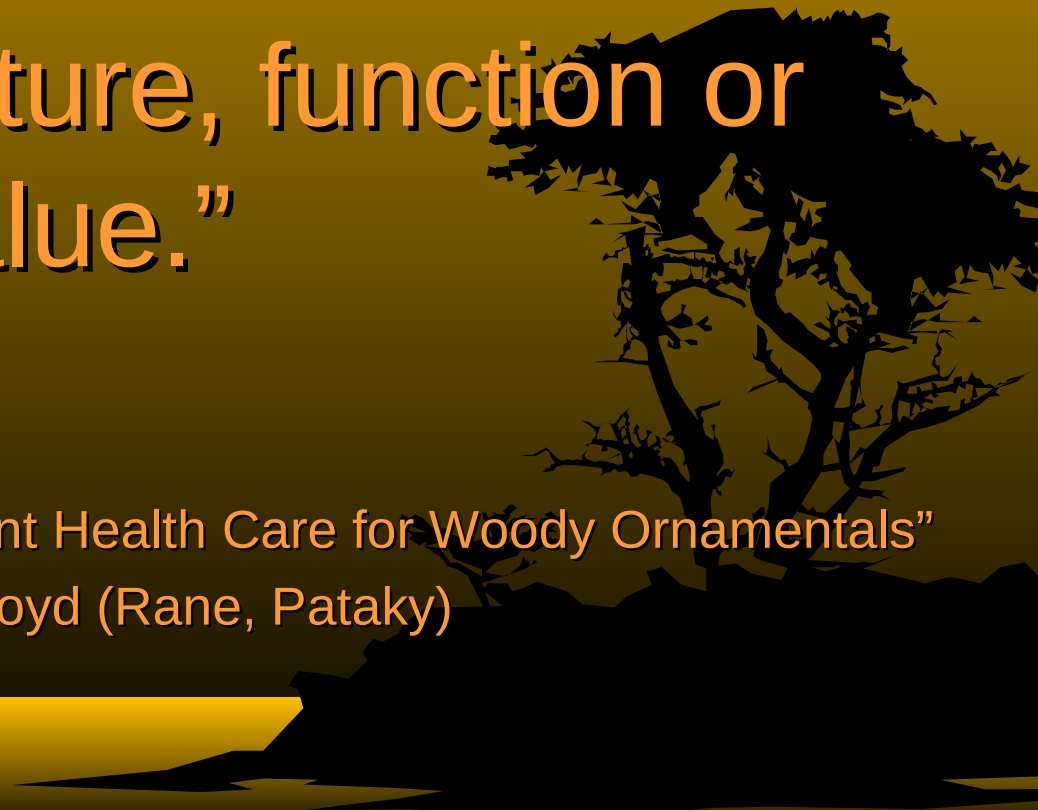


Plant diseases are complex interactions between plants, the environment, and plant pathogens. Horticulturist - heal thyself! Prevent diseases at the start with good plant selection, installation, and maintenance practices.

“Any disturbance of a plant that interferes with its normal structure, function or economic value.”



From: “Plant Health Care for Woody Ornamentals”
- Lloyd (Rane, Pataky)



Plant Disease Defined

A large, dark silhouette of a tree with many branches and leaves is positioned on the right side of the slide. The background is a solid yellow color. The tree's shadow is cast onto the ground below it.

“A malfunctioning of host cells and tissues that results from their continuous irritation by a pathogenic agent or environmental factor and leads to the development of symptoms. Disease is a condition involving abnormal changes in the form, physiology, integrity or behavior of a plant. Such changes may result in partial impairment or death of the plant or its parts.”

From: “Plant Pathology” - Agrios

Some Symptoms of Tree Decline, A Complex Disease

- ❖ Slow growth, including poor annual twig growth
- ❖ Sparse, undersized, distorted, often chlorotic foliage
- ❖ Browning of leaf margins
- ❖ Premature autumn color
- ❖ Large “distress” crops of seeds
- ❖ Subnormal storage of starch
- ❖ Progressive dieback of twigs and branches
- ❖ Adventitious sprouts where dieback occurred

From: “Diseases of Trees and Shrubs”
- Sinclair, Lyon & Johnson



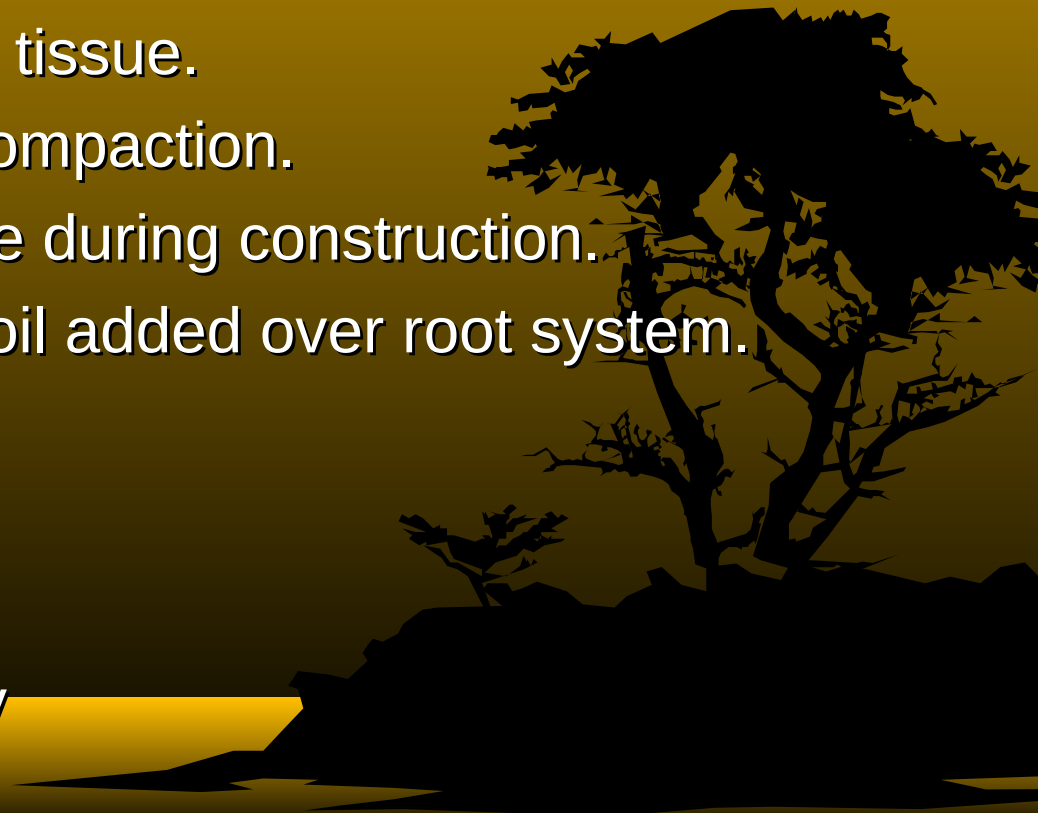
Some Keys to Tree Decline and Complex Diseases:

- ❖ Predisposition by biotic and abiotic stress factors.
- ❖ Reduced ability to respond to favorable factors.
- ❖ Contributing effects of opportunistic pathogens and secondary insects.
- ❖ Chronic, cumulative effects may eventually result in irreversible decline.
- ❖ Initial stress factor may cease, but secondary factors may perpetuate progressive decline.

From: "Diseases of Trees and Shrubs" - Sinclair, Lyon and Johnson

Ten Contributing Factors In Disease Complexes:

- ▣ Defoliation by diseases or insects.
- ▣ Drought or excess water.
- ▣ Cold injury to bark tissue.
- ▣ Root injury from compaction.
- ▣ Direct root damage during construction.
- ▣ Root injury from soil added over root system.
- ▣ Girdling roots
- ▣ De-icing salts
- ▣ Trunk wounds
- ▣ Nutrient deficiency



Examples of Complex Plant Diseases, Broadly Defined

- ❖ Maple decline
- ❖ Ash decline
- ❖ Oak decline
- ❖ Taxus decline
- ❖ Verticillium wilt disease
- ❖ Bacterial leaf scorch



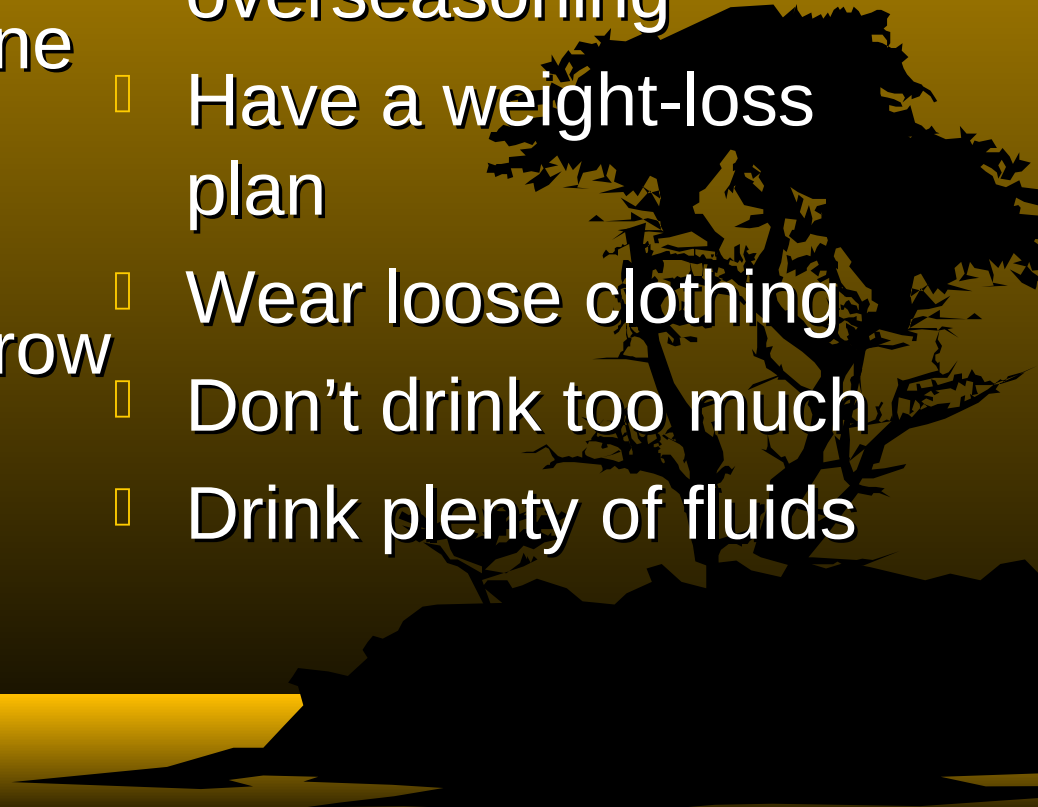
Management of Tree Decline

- ❖ Match tree to site.
- ❖ Proper irrigation, fertilization, pruning and other maintenance.
- ❖ Limit major environmental changes.
- ❖ Proper diagnosis.
- ❖ Realistic prognosis and removal decisions.

From: "Plant Health Care for Woody Ornamentals" - Lloyd (Rane & Pataky)

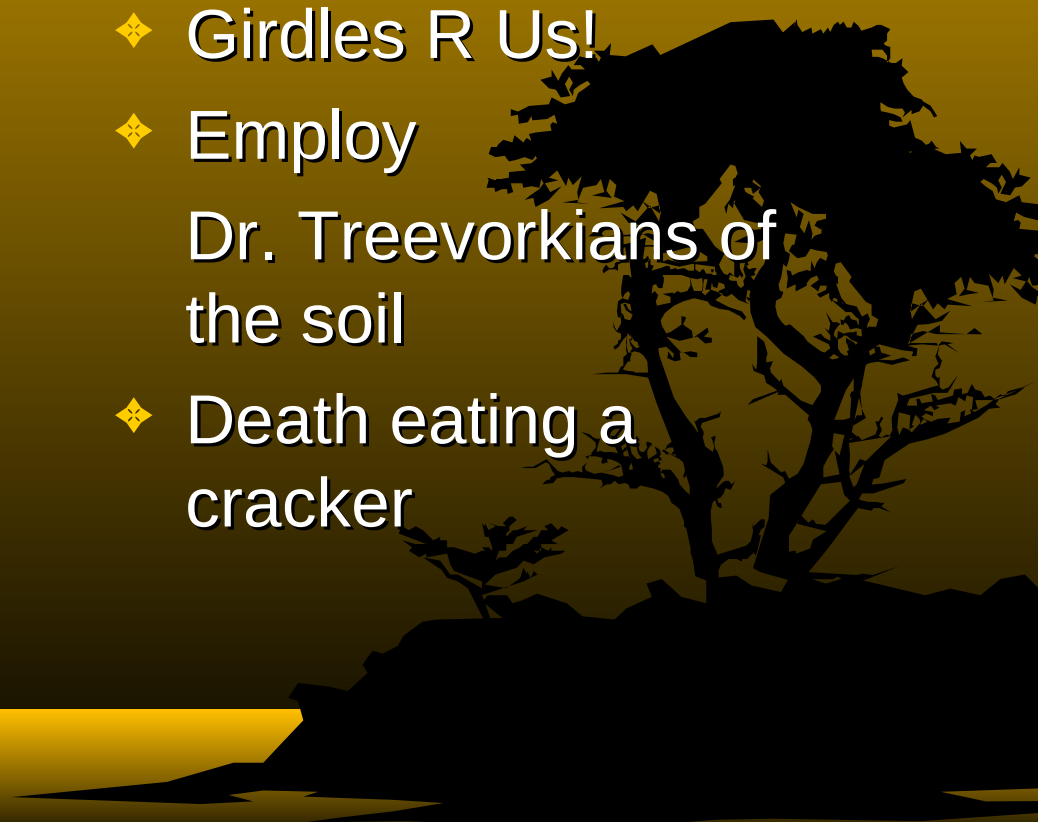
Ten Step Program for Healthy Trees

- ▣ Provide a good home
- ▣ Preventive medicine
- ▣ Remember your roots
- ▣ Provide room to grow
- ▣ Nature and nurture
- ▣ Avoid overseasoning
- ▣ Have a weight-loss plan
- ▣ Wear loose clothing
- ▣ Don't drink too much
- ▣ Drink plenty of fluids



Dr. Treevorkian's Ten Step Program for Assisted Herbicide

- ❖ Plant in the wrong site
- ❖ Plant pestiferous trees
- ❖ Change that grade: use my D9 Biotype
- ❖ Squeeze the trees!
- ❖ pHooney!
- ❖ Salts are the spice of death: Season until well-done
- ❖ Tree Toppers Unlimited
- ❖ Girdles R Us!
- ❖ Employ Dr. Treevorkians of the soil
- ❖ Death eating a cracker



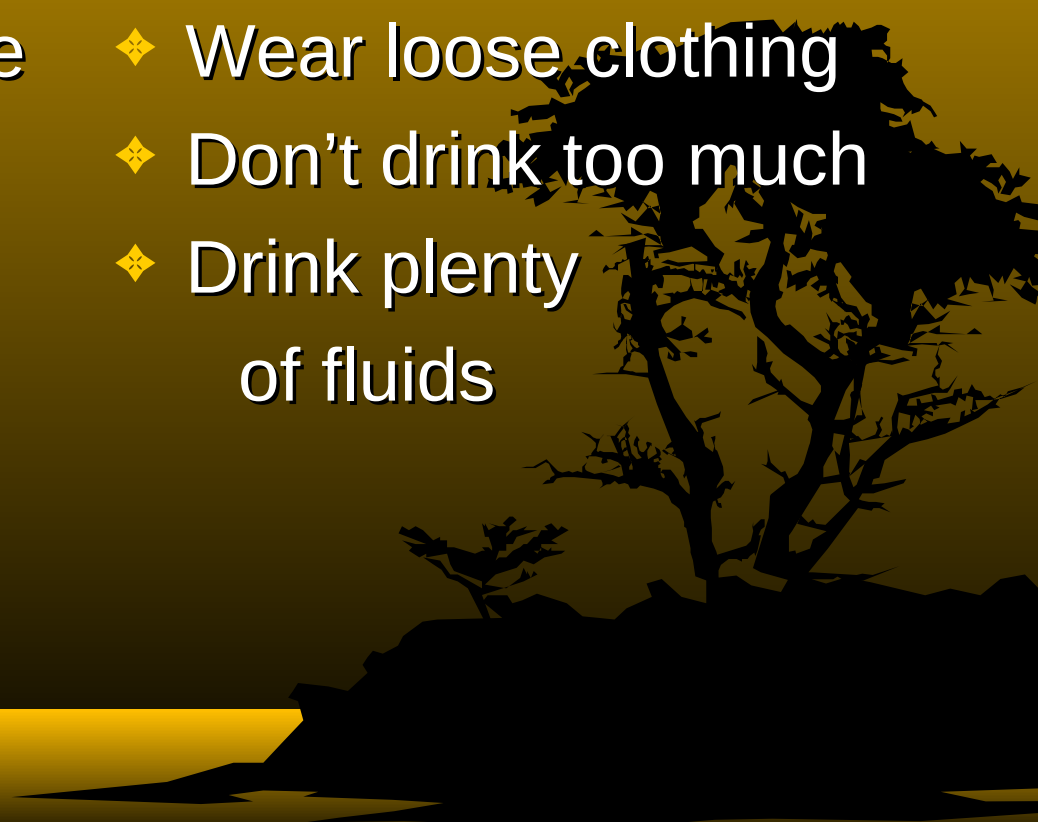
“The complexities of tree health and disease mandate that the practice of arboriculture must never be reduced to mere squirt-gun botany.”

- Jacques le Mauvais



Ten-Step Program for Healthy Trees

- ❖ Provide a good home
- ❖ Preventive medicine
- ❖ Remember your roots
- ❖ Provide room to grow
- ❖ Nature and nurture
- ❖ Avoid overseasoning
- ❖ Have a weight-loss plan
- ❖ Wear loose clothing
- ❖ Don't drink too much
- ❖ Drink plenty of fluids



Provide a good home.

(Select the right plant for the site.)



Preventive medicine.

(Select trees with good genetic pest and disease resistance.)



Remember your roots.

(Do not raise or lower soil levels around trees when planting or doing construction around trees.)



Provide room to grow.

(Provide adequate room for future root development when planting.)



Nature and nurture.

(Plant in sites with proper soil pH and other soil characteristics for the species.)



Avoid overseasoning.

(Do not overfertilize; protect sensitive species from road salts.)



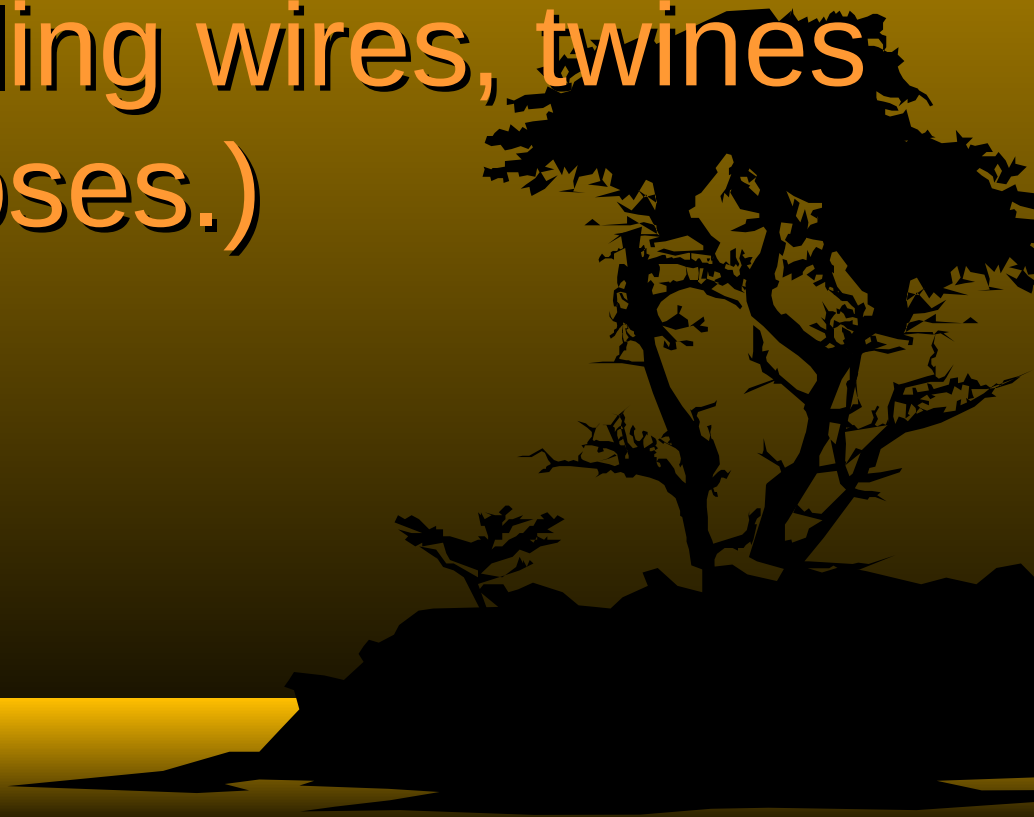
Have a weight-loss plan.

*(Always prune with a purpose
in mind.)*



Wear loose clothing.

**(Remove girdling wires, twines
and rubber hoses.)**



Don't drink too much.

(Plant in well-drained soils;
avoid overwatering.)



Drink plenty of fluids.

(Avoid underwatering.)



Assisted Herbicide

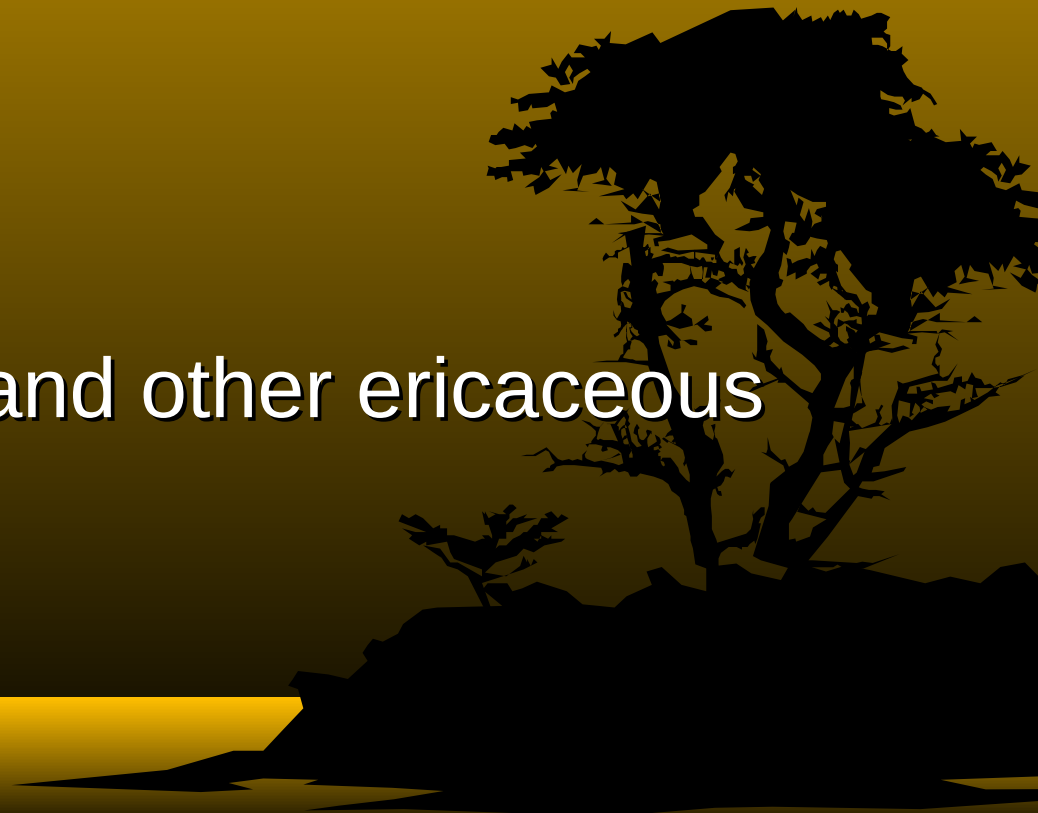
Are you guilty of the seven deadly sins of iatrogenicide?

- ◆ Poor Plant Selection
- ◆ Planting Too Deep
- ◆ Overmulching
- ◆ Overwatering
- ◆ Overfertilizing
- ◆ Overmowing
- ◆ Second Degree Girdling



Which of the following are acid-loving plants?

- A. River birch
- B. Pin oak
- C. Red maple
- D. Pachysandra
- E. Rhododendron and other ericaceous plants
- F. All of the above



“Dr. Treevorkian’s Seven Deadly Sins of Science”

1. Experimental error is divinely human.
2. Confound it!
3. Randomization and replication are just words.
4. Half-Bakerisms are not half-bad.
5. There are no significant others.
6. Chicken soup for the soil.
7. “Scuse me while I kiss this guy”.



Dr. Craborkian Recommends:

- ❖ All crabapples are created equal.
- ❖ Venturia uber alles
- ❖ Dolgos in your doorways
- ❖ Abstinence in all things.
- ❖ The child is the father of the man.



Dr. Treevorkian's Rules for Squirt Gun Botany:

- ❖ If a little is good, then more is better.
- ❖ Spray for pay.
- ❖ One size fits all.
- ❖ Seen one label, seen 'em all.
- ❖ There is something for everything.





Dr. Treevorkian's Secrets of the Soil.

- ❖ Gypsum is exactly what it sounds like.
- ❖ Fertilizer is plant food.
- ❖ Size doesn't matter.
- ❖ pHooey
- ❖ Soil is just a bunch of dirt.



Dr. Treevorkian's Infectious Disease Digest.

- ❖ Don't shoot until you see the whites of the ascis.
- ❖ Nature and nurture don't mix.
- ❖ Fungi shall inherit the earth.
- ❖ Dihydrogen oxide is just another chemical. 
- ❖ Strawberry Fields Forever. 

Dr. Treevorkian's Guide to Latin:



“Latin is a language, as dead as dead can be. First it killed the Romans and now it’s killing me.”



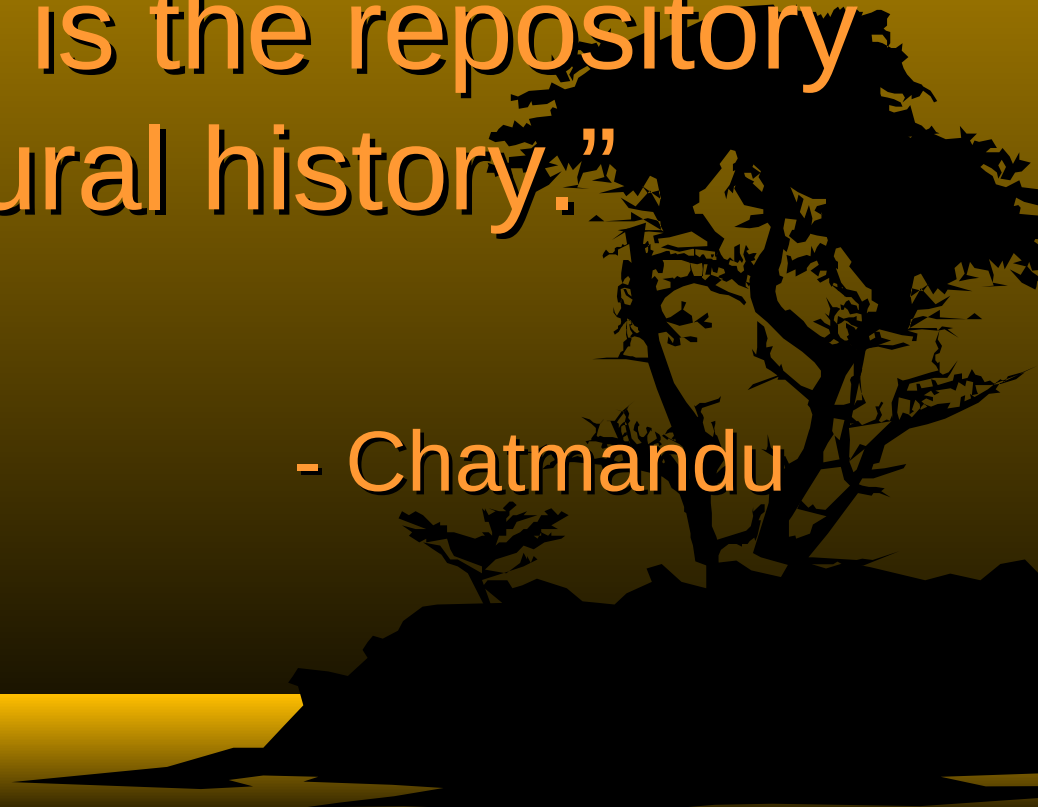
Dr. Treevorkian's Ten Rules for Plant Selection.



1. Death & Taxus - Plant in wet sites.
2. Shade your rose garden unter der lindens.
3. Promote Japanese maples as the next grate street tree.
4. Try silver maples as foundation plants.
5. Companion plant tip of the day: Walnuts and tomatoes.
6. Plant 'No Hopa' crabapples.
7. White pines for the white lines.
8. Basic Rhody Cocktail:
Lots
of Water with a Lime
Chaser
9. Forever Impatiens.
10. Zoysiagrass: Grave blankets of the future.

“Through its carbohydrate balance and its annual growth, a tree is the repository of its own natural history.”

- Chatmandu



Which of the following plants best tolerate wet soils?

- A . Winterberry holly or blue holly
- B . Taxus or Taxodium
- C . Red maple or Norway maple
- D . Flowering dogwood or cornelian cherry

dogwood



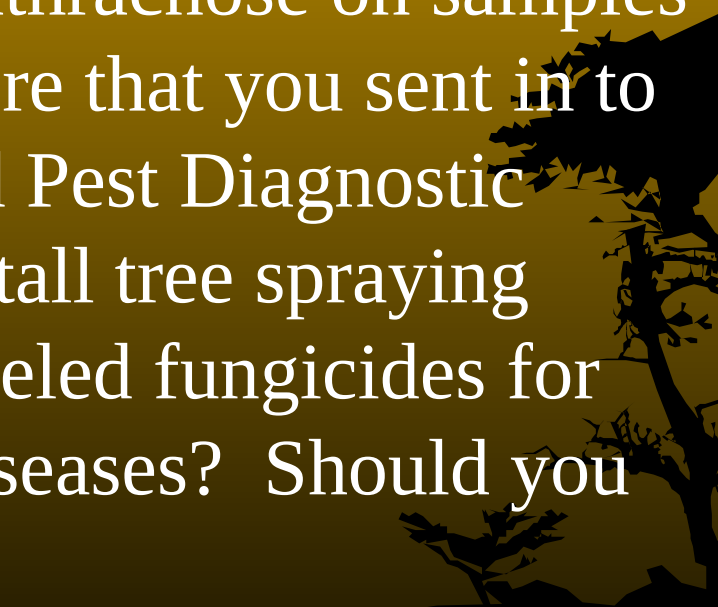
Rose Black Spot



This disease is caused by a fungus that infects rose leaves only if there is moisture on these leaves for a certain number of hours. Yet, there were tremendous outbreaks of this disease in some large rose gardens this past summer several weeks following a long, intense hot and dry spell.

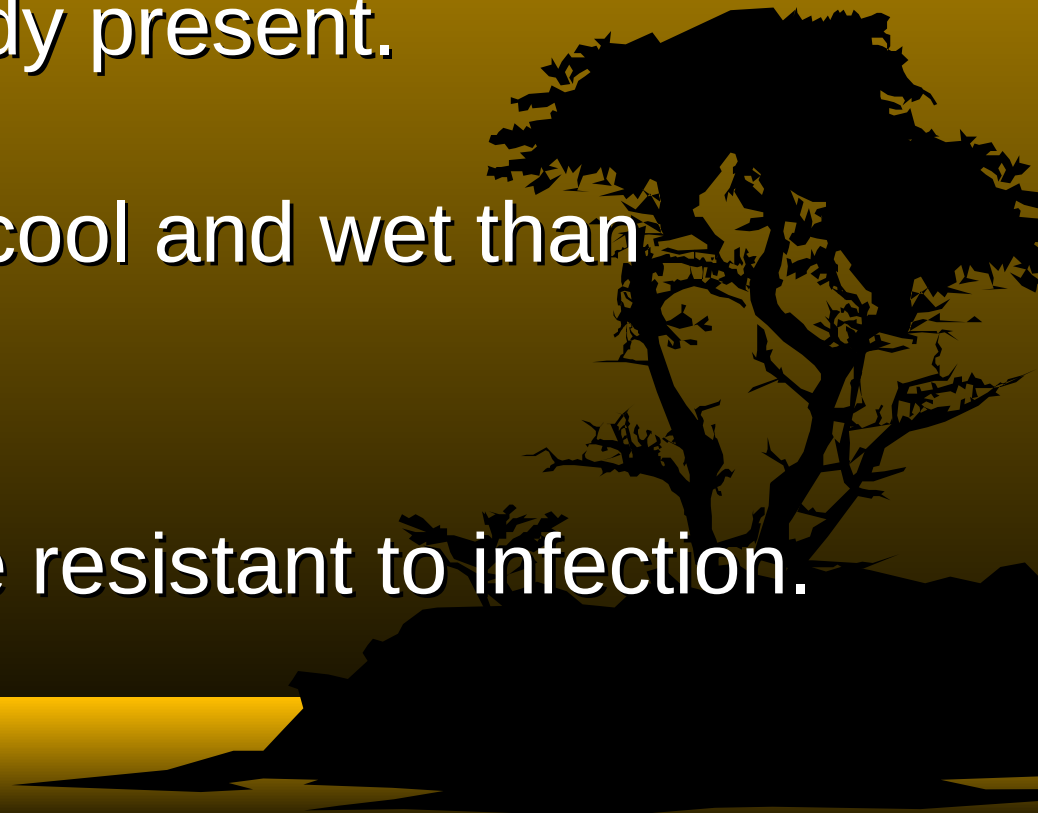
Anthracnose Leaf Blights

The time is late June. You have positive confirmation of anthracnose on samples of ash and sycamore that you sent in to the OSU Plant and Pest Diagnostic Clinic. You have tall tree spraying equipment and labeled fungicides for control of these diseases? Should you spray?

A silhouette of a tree with a large, rounded canopy and a smaller branch extending to the left. The tree is set against a bright yellow background that transitions to a darker yellow at the bottom. The tree's shadow is cast on the ground below it.

Three reasons not to spray once you see symptoms of anthracnose:

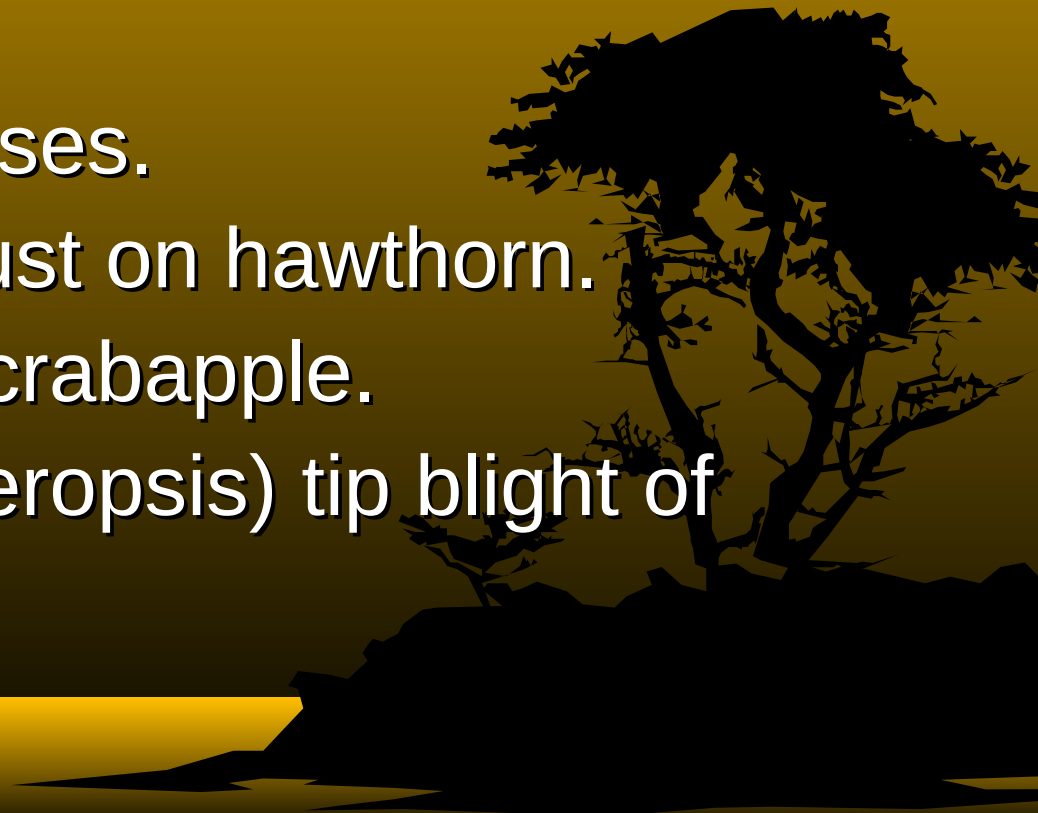
1. Disease is already present.
2. Weather is less cool and wet than earlier.
3. Leaves are more resistant to infection.



Timing is Everything.

When do fungal infections occur with these diseases?

- A. Black spot of roses.
- B. Cedar quince rust on hawthorn.
- C. Apple scab on crabapple.
- D. Diplodia (Sphaeropsis) tip blight of pine.



Verticillium Wilt Diseases

What about this list is relevant to a discussion of *Verticillium* wilt disease?

- ❖ All Conifers
- ❖ Birch
- ❖ Crabapple
- ❖ Dogwood
- ❖ Holly
- ❖ Oak
- ❖ Pear
- ❖ Plane trees
- ❖ Sweet Gum
- ❖ Willow



Verticillium Wilt Diseases

What about this list?

- ❖ Ash
- ❖ Barberry
- ❖ Catalpa
- ❖ Elm
- ❖ Magnolia
- ❖ Maple
- ❖ Redbud
- ❖ Russian Olive
- ❖ Tulip tree
- ❖ Viburnum



A Publication You Should Know:

“Pest Resistant Ornamental Plants”

- by Deborah C. Smith-Fiola

Rutgers Cooperative Extension

1623 Whitesville Road

Toms River, NJ 08755-9720

Phone: (908) 349-1246



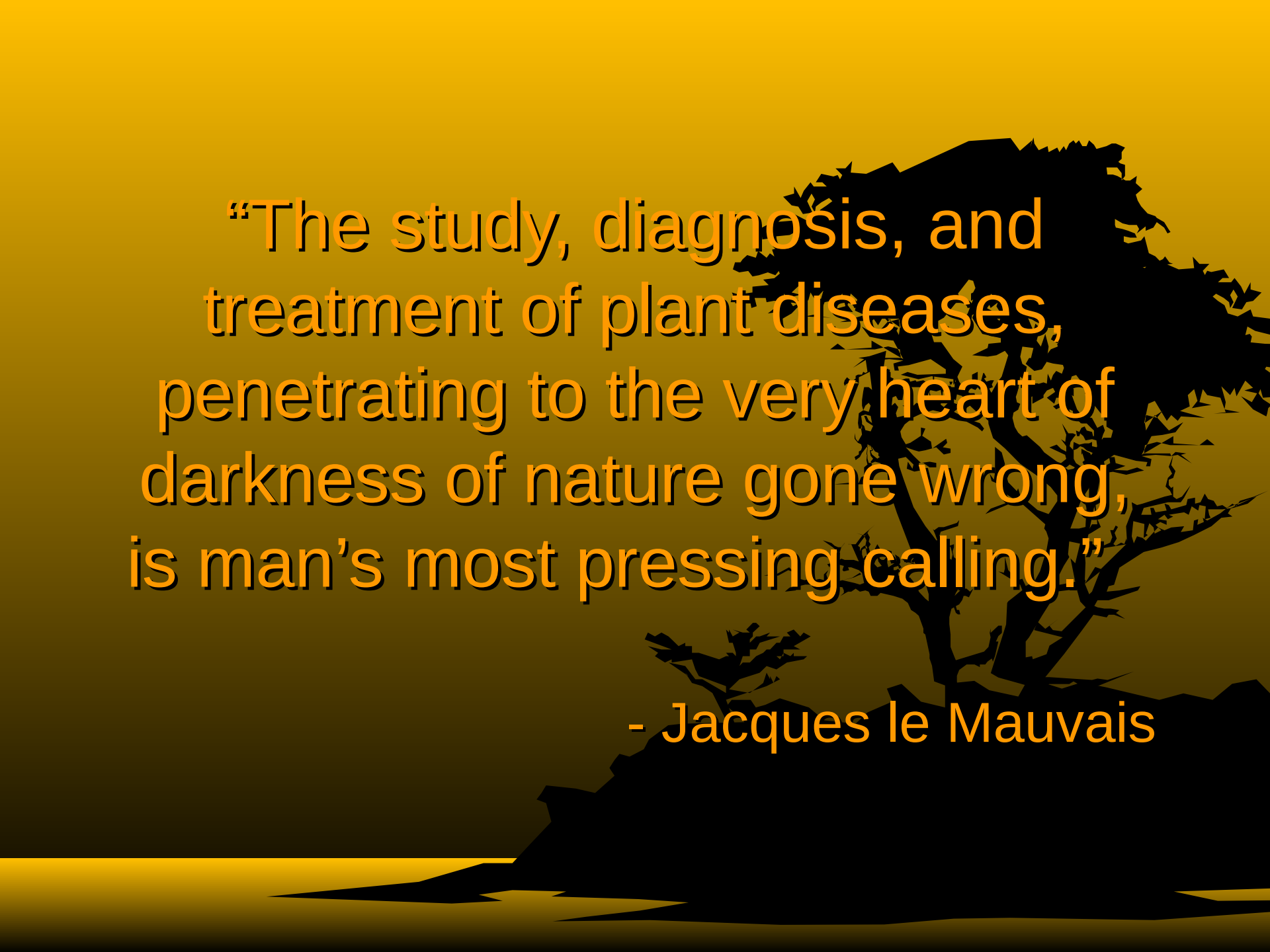
Rose Black Spot: Some Resistant Roses

- ❖ Hybrid Teas: Chrysler Imperial, Tropicana
 - ❖ Floribundas/Grandifloras: Betty Price, Sonia
 - ❖ Shrub Roses: All That Jazz, Carefree Wonder
 - ❖ Miniatures: Gourmet Popcorn, Rose Gilardi
 - ❖ Rugosa Hybrids: Polyantha, The Fairy
- 

Some Problems Have
No Controls.

What do you sell your customers
to control root rot of trees?





“The study, diagnosis, and treatment of plant diseases, penetrating to the very heart of darkness of nature gone wrong, is man’s most pressing calling.”

- Jacques le Mauvais

Sherlock Holmes & The Diagnostic Process

A large, dark silhouette of a tree with many branches and leaves is positioned on the right side of the slide. The background is a solid yellow color.

Sherlock Holmes and Dr. Watson went on a camping trip. After a good meal and a bottle of wine they lay down for the night, and went to sleep. Some hours later, Holmes awoke and nudged his faithful friend.

Sherlock Holmes & The Diagnostic Process

A large, dark silhouette of a tree with many branches and leaves is positioned on the right side of the slide. The background is a solid yellow color. The tree's shadow is cast onto the ground below it.

“Watson, look up at the sky and
tell me what you see.”

Watson replied, “I see millions and
millions of stars.”

Holmes asked, “What does that
tell you?”

Sherlock Holmes & The Diagnostic Process



Watson ponders and replies:

1. Astronomically, it tells me that there are millions of galaxies and potentially billions of planets.
2. Astrologically, I observe that Saturn is in Leo.
3. Horologically, I deduce that the time is approximately a quarter past three.
4. Theologically, I can see that God is all powerful and that we are small and insignificant.
5. Meteorologically, I suspect that we will have a beautiful day tomorrow.

Diagnostics: Putting Things Into Perspective



Watson concludes: “So, Holmes, what does
it tell you?”

Holmes thought a minute, then spoke:
“Watson you idiot! Someone has stolen our
tent!”

“The true voyage of discovery
lies not in finding new
landscapes, but in having new
eyes.”

- Marcel Proust

