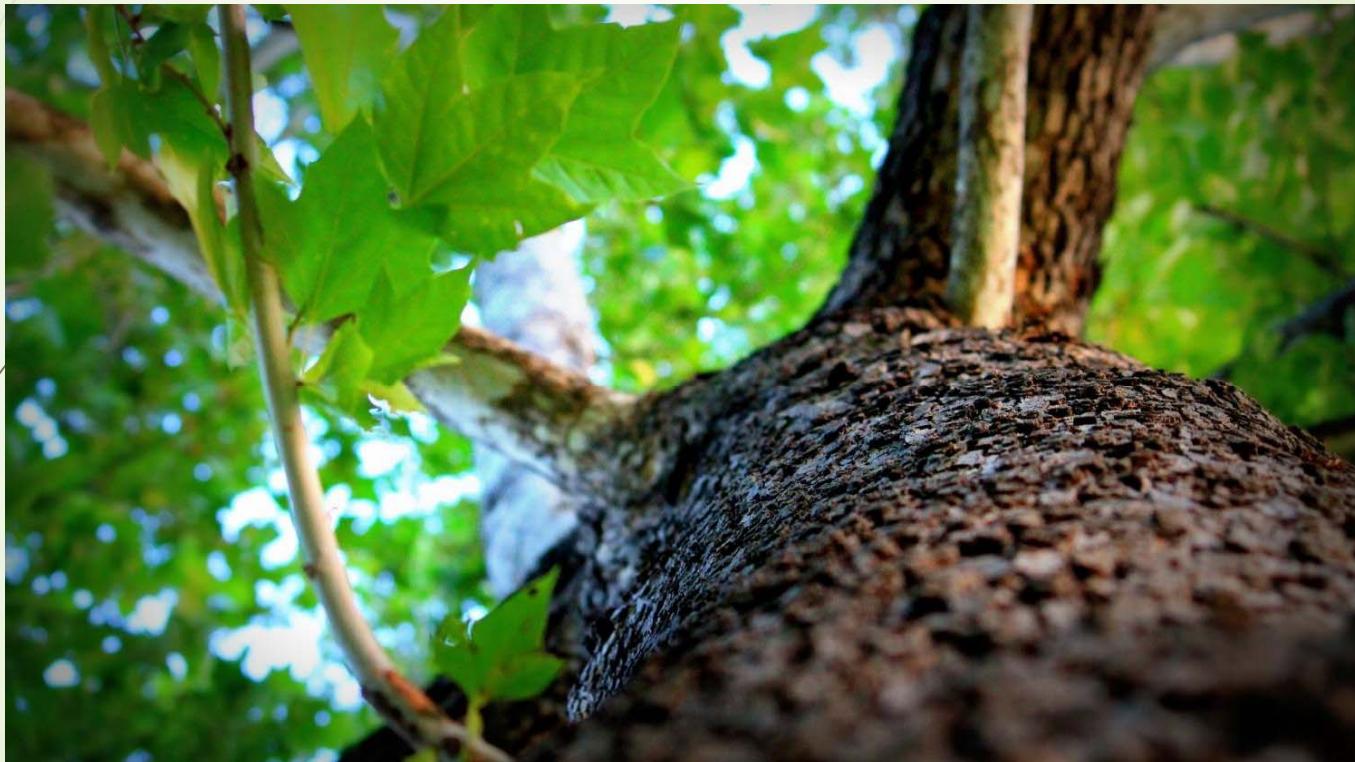


# Plant Health Care

Certified Arborist Prep Course



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# Key Concepts

- ▶ Philosophy of Plant Health Care (PHC)
- ▶ Appropriate response process (ARP)
- ▶ Allocation of Resources
- ▶ Effective Monitoring Program
- ▶ Pest Management Options
- ▶ Preventive strategies



# Plant Health Care (PHC)

- A holistic and comprehensive program to manage the health, structure, and appearance of plants in the landscape.

(ISA)

- A multidimensional strategy for plant care that focuses on plant vigor and relies on plant selection and integration of a broad range of techniques aimed at protecting and enhancing plant health; an outgrowth of IPM.

(Smith and others, 1995)



# Vigor vs. Vitality

- Vigor: inherent genetic capacity to resist stress
- Vitality: ability to thrive in a given environment



# Vigor

- Inherent adaptability to various environmental conditions
  - Soil types
  - Moisture conditions
  - Cold or heat
- Select species well matched to environment and resistant to pests
  - Hardiness zone
  - Site characteristics
  - Varieties and cultivars
  - ...

# Vigor





# Vitality

► Measure of Plant Vitality

-Some only measure success of treatments and practices by increased growth in :

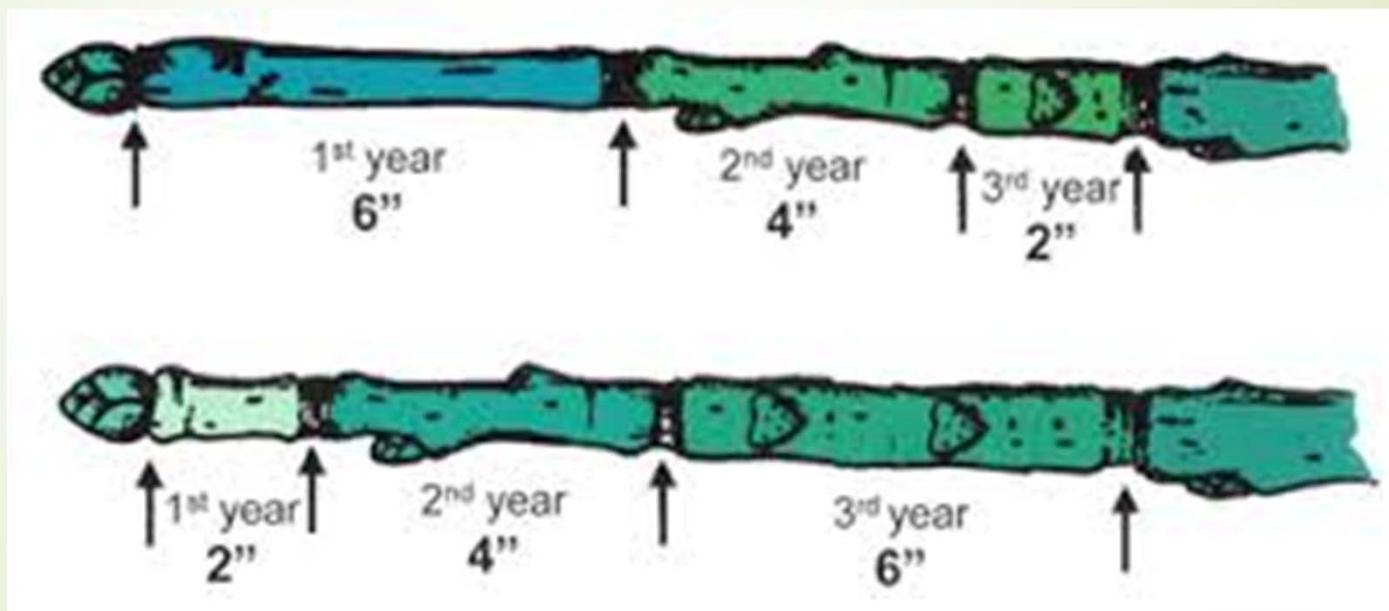
- Height
- Trunk diameter
- Root mass
- Total leaf area

# Vitality



# Measure of Vigor and Vitality

Shoot Growth





# Right Tree, Right Place

Not just for power lines

Match species to site first!

Light, Water, CO<sub>2</sub>, Chlorophyll → Photosynthesis

Light, CO<sub>2</sub>, Chlorophyll → **STRESS**



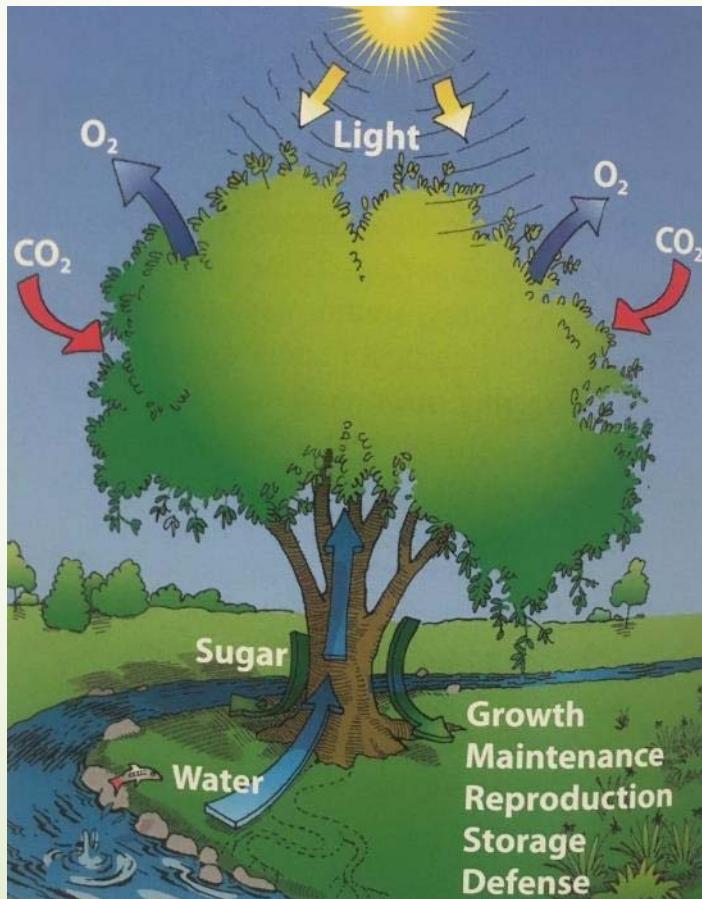
Plant resources, produced through photosynthesis, are allocated among four primary functions:

- ▶ Growth
- ▶ Storage
- ▶ Defense
- ▶ Maintenance(reproduction)

# Resource Allocation

Photosynthesis → Sugar = Energy

Primary Functions of Energy:





Stress can be described as any factor that limits a plant's ability to acquire sufficient light, water, or essential minerals.

# Limited Resources = Stress

Often related to soil and environmental conditions

- ▶ pH
- ▶ drought
- ▶ excessive water
- ▶ heat

Not enough water

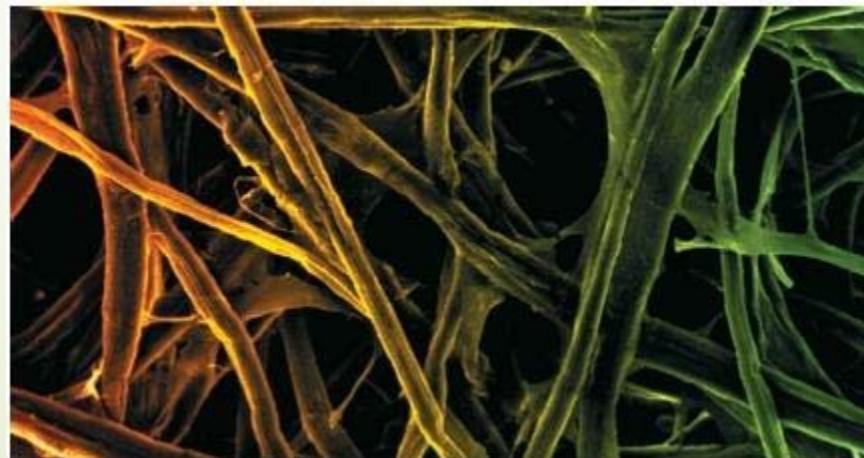


Excessive water



# Cellulose

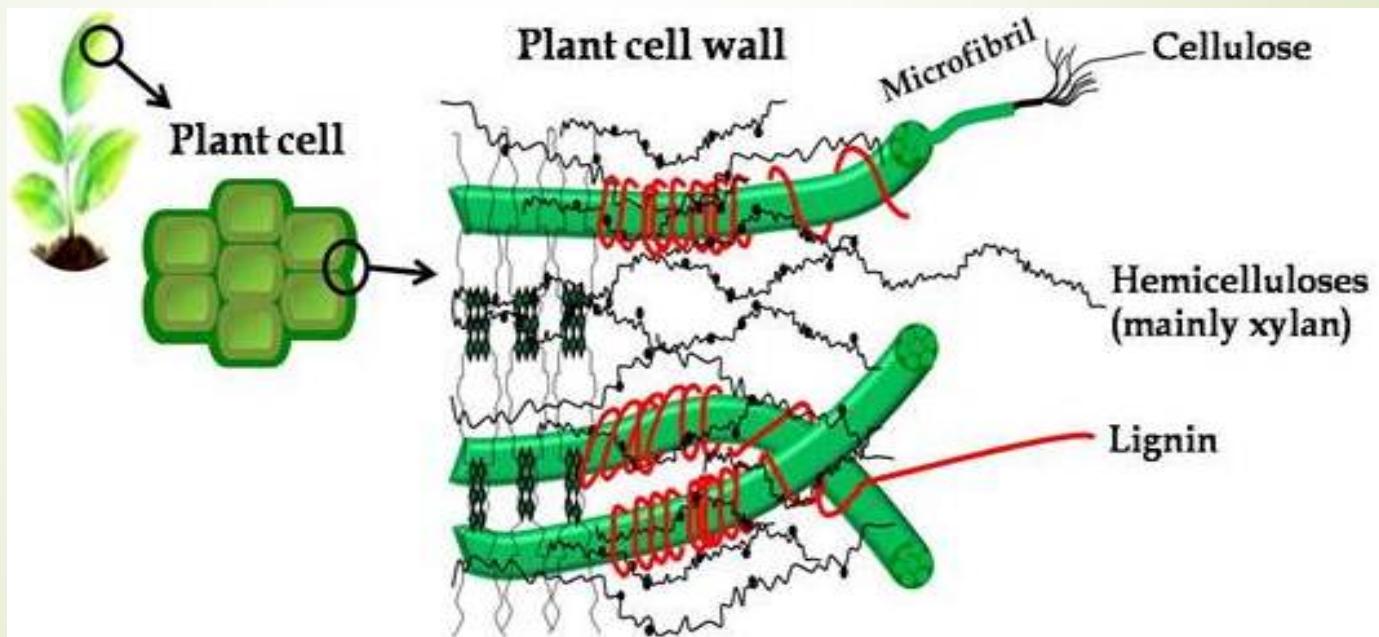
- ▶ Chain-like molecules found in the cell wall of trees
- ▶ Provides strength to stand and enables water and nutrient movement
- ▶ Defense mechanism as many insects cannot digest it



Micrograph of wood cellulose

# Lignin

- ▶ Further strengthens cell walls
- ▶ Also indigestible by many insects



## Trees don't heal!

- Trees don't have an immune system
- *Trees have a defense system*
- *Trees Compartmentalize*



# Defense Mechanisms

- Physical
- Cellular
- Allelochemicals



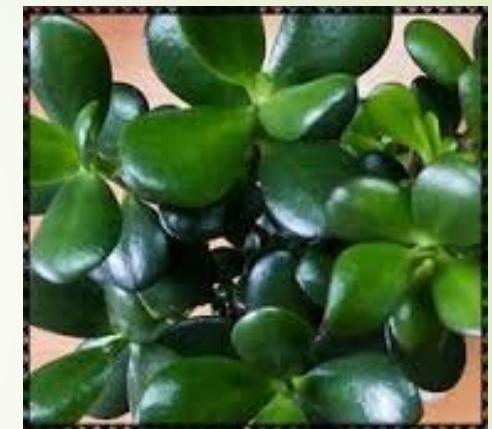
# Defense Mechanisms

► Physical

► Thorns

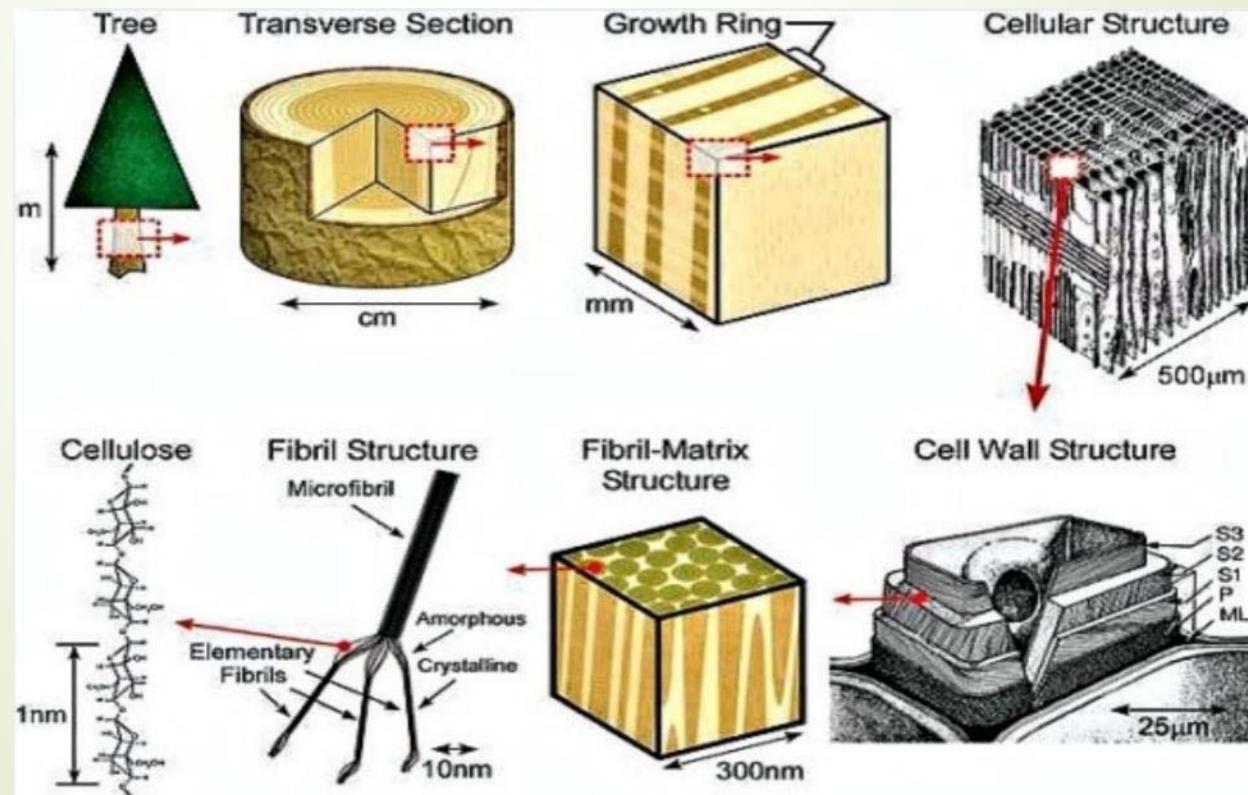
► Thick leaves

► Hairs



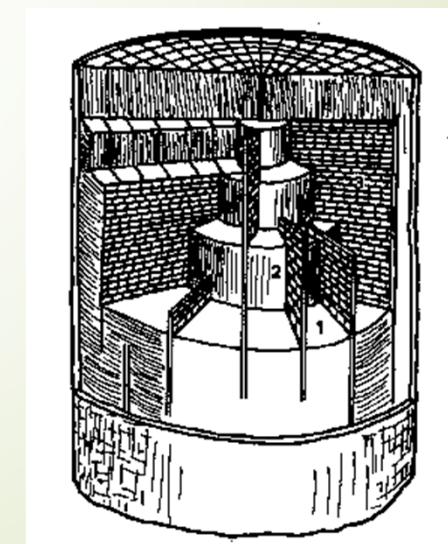
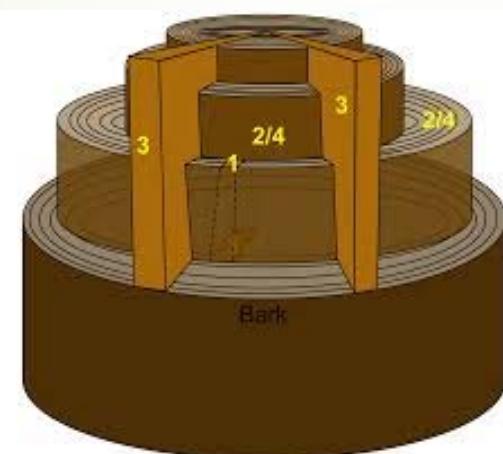
# Defense Mechanisms

## ► Cellular



# C.O.D.I.T.

- Compartmentalize
- Of
- Decay
- In
- Trees



# Defense Mechanisms

## ► Allelochemicals





# The Process of PHC

Monitoring is the essential part of PHC

- observe
- identify
- record
- analyze

# PHC – Monitoring

## ► Site info

- Changes in drainage
- New plantings
- New hardscape or maintenance



# PHC – Monitoring

- ▶ Plant Condition
  - ▶ Leaf size, color
  - ▶ Twig growth
  - ▶ Symptoms or signs

