



Plant

DIAGNOSTIC CENTER

Solving your plant health problems

Plant Diagnostics 101

What's normal, what's not and why

Dr. Raj Singh

Assistant Professor, LSU AgCenter, Baton Rouge, LA

innovate . educate . improve lives

for the latest research-based information on just about anything, visit our Web site: www.lsuagcenter.com



PLANTS GET SICK TOO!

Virus Disease
Mosaic viral symptoms in cabbage

Tumors
Agrobacterium on rose plant

Corn Smut Fungus

HELP!!!
I need a plant doctor!

Wound Infection
Conk fungus on wounded tree

Fungal-Bacterial Infections
Tomato fruit rot or anthracnose

Roundworm or Nematode Infection
Root-knot disease in carrot

Nutrient Deficiency
Iron deficiency of grape plant

Plant Pathologists help keep plants healthy

Discovering Why Plants Get Sick

Plant Detectives



The culprits are often invisible until viewed under a microscope! Then the plant detective (pathologist) can tell, "Who did it."

Smoking mushrooms?? Nope! The smoke is really **thousands of spores** leaving "home" to attack unsuspecting plants.

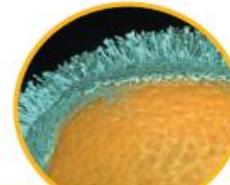


Blobs of fungus, called corn smut, are often found on ears of corn. Some people like to eat it. Yum!

Whisker Mold on oranges is caused by a species of *Penicillium*. Some strains of this fungus give us the antibiotic penicillin.



Inside the brightly colored spots on these apple leaves are tiny spores that, when released, infect juniper plants causing these **gooey orange tentacles** to form.



Plant Pathologists solve plant health problems.

Learn more at:

The American Phytopathological Society
www.apsnet.org/careers

The main image courtesy of the Agricultural Research Service. Tobacco of Tobacco courtesy of B. Gault.

Symptom causing agents

- Biotic or Living Agents
 - Disease and damage
 - Infectious agents can be transmitted from one plant or plant part to another
 - Plant pathogens
 - Nematodes
 - Insects and mites
 - Spread in space and time

Symptom causing agents

- Abiotic or Nonliving Agents
 - Disorders
 - Non-infectious agents cannot be transmitted from one plant or plant part to another
 - Environmental extremes
 - Chemical misuse
 - Nutrient deficiencies or toxicities
 - Do not spread in time and space

Keys to successful pest mgmt.

- Accurate diagnosis & identification
- Rapid & early detection
- Understanding disease cycle
- Understanding disease triangle
- Integrated disease management

innovate . educate . improve lives

for the latest research-based information on just about anything, visit our Web site: www.lsuagcenter.com



Accurate diagnostics

- Different agents may cause similar kind of symptoms
- Same agent may cause different kind of symptoms
- High impact pathogens
- Quarantine regulations

innovate . educate . improve lives

for the latest research-based information on just about anything, visit our Web site: www.lsuagcenter.com



Different agents on same host



innovate . educate . improve lives

for the latest research-based information on just about anything, visit our Web site: www.lsuagcenter.com

Same agent on same host



innovate . educate . improve lives

for the latest research-based information on just about anything, visit our Web site: www.lsuagcenter.com

Cercospora leaf spot on Pittosporum



innovate . educate . improve lives

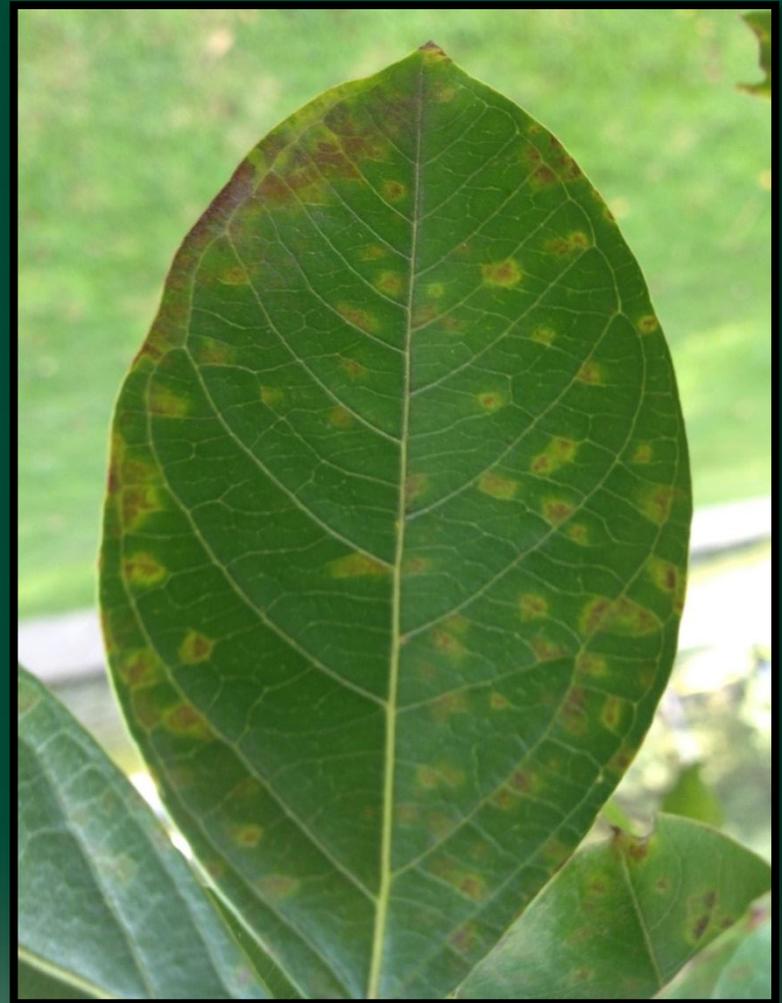
for the latest research-based information on just about anything, visit our Web site: www.lsuagcenter.com



Bacterial leaf spot



Fungal leaf spot



innovate . educate . improve lives

for the latest research-based information on just about anything, visit our Web site: www.lsuagcenter.com



Normal growth

Disease symptom



innovate . educate . improve lives

for the latest research-based information on just about anything, visit our Web site: www.lsuagcenter.com



Insect or disease



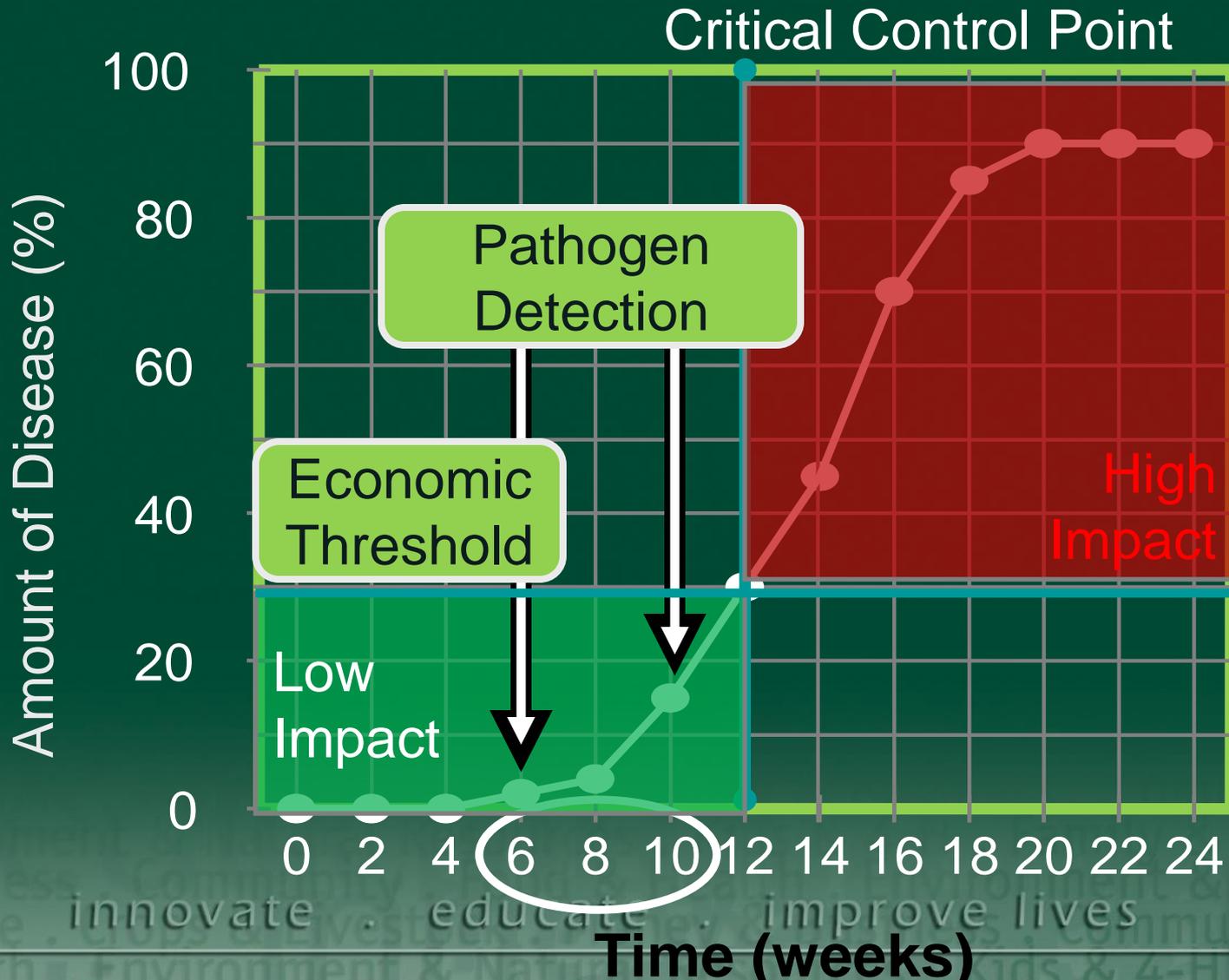
Pecan black aphid

innovate . educate . improve lives

for the latest research-based information on just about anything, visit our Web site: www.lsuagcenter.com



Rapid and early detection



Rapid and early detection



innovate . educate . improve lives

for the latest research-based information on just about anything, visit our Web site: www.lsuagcenter.com



Rapid and early detection



innovate . educate . improve lives

for the latest research-based information on just about anything, visit our Web site: www.lsuagcenter.com



What do clients want to know?

- What is wrong with my plants?

A diagnostician must be observant, ask questions, and records information.

Gather as much information as you can.

Remember symptoms may be caused by complex of agents

- How do I get rid of the problem?

innovate . educate . improve lives

for the latest research-based information on just about anything, visit our Web site: www.lsuagcenter.com



Host plant

- Host plant ID
- Genus species -common name misleading
- Variety and cultivar
- Geographic range
- Possibly some specific diseases

innovate . educate . improve lives

for the latest research-based information on just about anything, visit our Web site: www.lsuagcenter.com



Normal plant

- Normal plant characteristics
- Variegated foliage
- Flaky bark
- Fall colors



Abnormalities

- Size, Shape, Color
- Mushrooms
- Overall growth
- Lichens or moss
- Sooty Mold



Lichens



Ball moss



How was the weather?

- Temperatures
- Rainfall and drought
- Hail
- Lightning
- High winds



innovate . educate . i

for the latest research-based information on just about anything, visit our

What are the soil conditions?

- Soil type
- Soil fertility
- Soil pH
- Soil drainage
- Soil compaction



innovate . educate . improve lives

for the latest research-based information on just about anything, visit our Web site: www.lsuagcenter.com

Soil fertility

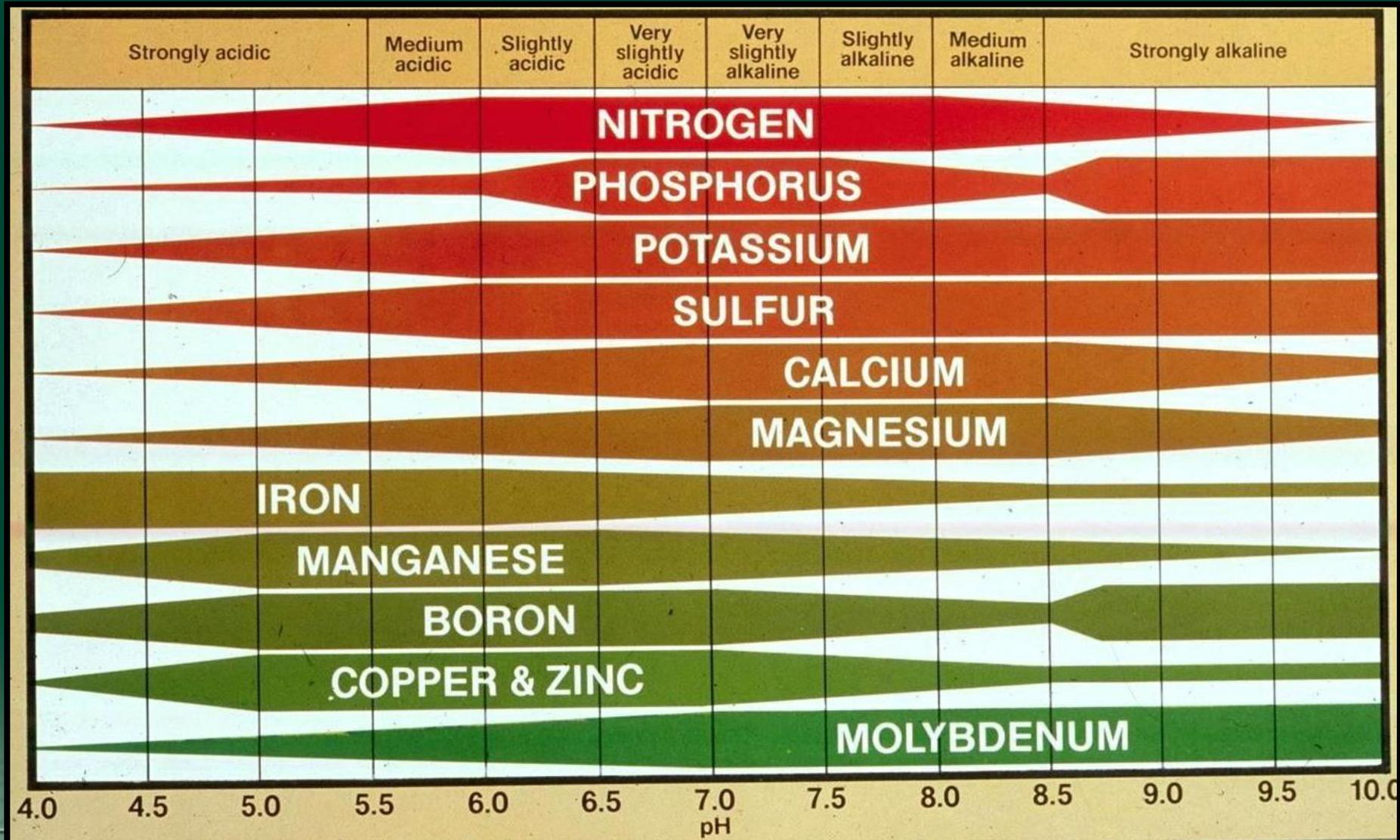


innovate . educate .

for the latest research-based information on just about anything, visit

RESEARCH & EXTENSION

Soil pH



Soil drainage and compaction



for the latest research-based information on just about anything, visit our Web site: www.lsuagcenter.com

AgCenter
Research & Extension

What are the cultural practices?

- Plant source
- Planting depth
- Plant spacing
- Mulch
- Irrigation



innovate . educate . improve

for the latest research-based information on just about anything, visit our Web site: www.lsuagcenter.com

How to mulch trees?



How my friends think it should look



How my parents think it should look



How my neighbors think it should look



How society thinks it should look



How I thought it should look



How it should look

Incorrectly applying **mulch** around a tree in the shape of a **volcano** can cause the roots to grow around the trunk, **strangling** it which could eventually lead to the **loss** of the **tree**.

Learn more at <http://texastreeplanting.tamu.edu/>



TEXAS A&M
FOREST SERVICE



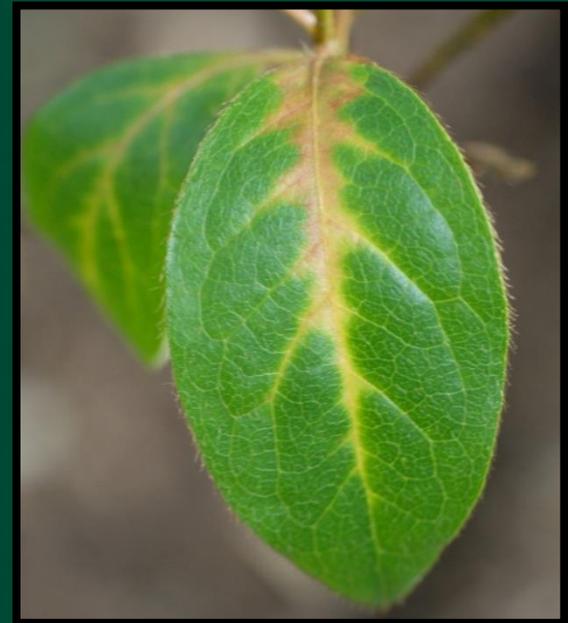
What is fertilizer history?

- Nutrient source.
- Time and type of application.
- Over and under fertilization.
- Nutrient toxicity and deficiency.



What is chemical history?

- Herbicide injury
- Application
- Edge effect and May appear at once
- Neighbors
- Tank mix and over-doze



What plant parts are affected?

- Above ground
- Roots
- Whole plant



te . improve

anything, visit our Web site: www.lsu

What is the symptoms pattern?

- Examine plants next to the infected one
- Examine other host species
- Symptoms uniform vs random
- Progression of symptoms



Symptoms and signs

- Symptom is the visual effect produced by a pest or a pathogen.
 - Leaf spots, wilt, root rot.....
- Sign is the physical evidence of a pest or a pathogen.
 - Fungal spores, insects, sooty mold.....

What are the symptoms?

- Leaf spots
- Galls
- Rusts
- Diebacks
- Cankers
- Chlorosis
- Necrosis
- Mildews
- Wilts



innovate . educate . improve lives

for the latest research-based information on just about anything, visit our Web site: www.lsuagcenter.com

What are the signs?

- Mycelium and spores
- Mold or mildew
- Sclerotia
- Rusts or smuts
- Bacterial ooze
- Root knots
- Insects and exuviae
- Mites and web
- Insect droppings



Picture: 0088-20121023_102001.bmp

innovate . educate . improve lives

for the latest research-based information on just about anything, visit our Web site: www.lsuagcenter.com

Case study 1



innovate . educate . im

for the latest research-based information on just about anything, visit our Web site: www.lsuagcenter.com

LSU AgCenter
Research & Extension

Case study 2



innovate . educate . i

for the latest research-based information on just about anything, visit our

Case study 3



innovate

for the latest research-based information on just about anything, visit our Web site: www.lsuagcenter.com



Case study 4



Case study 5



Case study 6



Case study 6



for the latest research-based information on just about anything, visit our Web site: www.lsuagcenter.com

LSU Center
Research & Extension





Plant

DIAGNOSTIC CENTER

Solving your plant health problems

Plant Diagnostic Center
302 Life Sciences Bldg.
LSU AgCenter
Baton Rouge, LA 70803
225-578-4562
Fax: 225-578-1415

www.lsuagcenter.com/PlantDiagnostics

www.lsuagcenter.com/plantdiagnostics

Cell: 225-747-2367

Office: 225-578-4562

rsingh@agcenter.lsu.edu

innovate . educate . improve lives

for the latest research-based information on just about anything, visit our Web site: www.lsuagcenter.com

