Trees and Shrubs for Sustainable Built Environments
HORT 306
Fall 2018

Disease, Pest, and Cultural Practices Impact Landscape Design Sustainability
Required Reading

• There is no formal required reading with this lecture, but remember that many of the terms covered in this lecture are in the glossary of your text and you should look them up if you are not familiar with them.

• Also color images of some pest, disease, and cultural conditions referenced in this section are provided in the first color plate section of your text.
90 / 10 Rule

- Thousands of potential pathogens / pests
- A few common diseases and pests account for many of our landscape problems
- Separate pest, disease, and mechanical damage
- Important to recognize pathogen / pest damage from physiological disorders / deficiencies
- Often a complex of causal factors are the culprit
- Cultural conditions interact with all of the above and the plants
Physiological Disorders

- Mineral nutrient deficiencies/toxicities
- Physiological leaf scorch
- Spray injuries
  - Intentional sprays or unintentional drift
- Lightening strike
- Mechanical injuries
- Chemical injuries
- Sun scald
- Winter injury
- Circling roots
- Inadequate chilling
Susceptibility to physiological problems vary within a species

Provenance versus seed source!
What’s Causing This Damage?
Site Interacts With Disorders/Disease
Common Pests

- **Insects**
  - **Chewing**
    - (grasshoppers, Japanese Beetles, caterpillars, borers, bagworms, leaf miners, ants, termites)
  - **Rasping**
    - (thrips)
  - **Piercing/sucking**
    - (aphids, weevils, mealy bugs, scales, whiteflies, leafhoppers, sharpshooters)
Common & Uncommon Pests

- **Arachnida** (spiders, spider mites, scorpions)
- **Mollusca** (slugs / snails with slim trails)
Common & Uncommon Pests

- Mammals (deer, rabbit, mole, vole, raccoon, mice, rats, wild hogs, armadillos, prairie dogs, dogs, beaver, bear, gophers ...)
- Birds, lizards, turtles, snakes ...
- Humans (particularly subhumans ... kids!)
Common Disease Problems

- **Bacterial**
  - Angular lesions, often near veins
  - Leaf spots (zinnia, *Xanthomonas* on geraniums)
  - Twig dieback, cankers (fire blight)
  - Phloem infections (wetwood / slime flux)
  - *Xylella fastidiosa* (fastidious xylem inhabiting bacteria)
  - Crown gall (*Agrobacterium tumefaciens*)
Common Disease Problems

- **Fungal**
  - Circular lesions / spores
  - Root rots (cotton root rot)
  - Foliar diseases (sooty mold, *Entomosporium* leaf spot, black spot, powdery mildew)
  - Xylem clogging (Dutch elm disease, *Verticillium* wilt, *Fusarium* wilt, oak wilt)
  - Cankers (chestnut blight)
  - Twig dieback (juniper blight, anthracnose)
  - Damping-off (*Pythium*, water molds)
Entomosporium leaf spot
Common Disease Problems

• **Viral** (yellow mottle & bud drop of *Camellia*, tulip breaking virus, rose rosette virus)
• **Mycoplasma-like** (lethal yellows of palms)
• **Viroids** (chrysanthemum yellows)
• **Nematodes / Nemas** (root knot nematodes, microscopic eelworms)

*Courtesy Dr. Kevin Ong*
Cultural Conditions Are Often To Blame

- Weedeater / lawn mower blights
- Construction damage
- Poor site prep / design / installation
- Shade / sun patterns
- Poor maintenance practices
  - Irrigation practices
  - Fertility
  - Pruning
  - Staking
  - Mulching
  - Planting
  - Circling / girdling roots
  - Improper staking
  - Improper pruning
  - Lawn mower blight
Other cultural practices

Exposed Roots

Windthrow from roots only in mulches

Fill Soil & Compaction

Graft incompatibility

Graft incompatibility
Firewood Landscapes
Establishment Practices Are Critical

Avoid planting too deep!
Be Sparing On Pine Bark Mulch

More is not always better!

Koelreuteria bipinnata

Image courtesy Dr. Douglas Airhart
Irrigation issues

• Zoning plants
  – Keeping the bank account in the black
  – Quantity & quality
• Salinity / pH concerns
• Subcanopy applications are critical for our region
• Interactions with soil conditions
Cost-benefits to site modifications

- Soil replacements
- Soil amendments

Typical home site in Central Texas
Cost-benefits to site modifications

- Raised beds / planters
Traits To Consider When Selecting Adapted Plants For Our Region

• Specific challenges in our region
  – High day & night temperatures
  – Poor internal drainage in many soils
  – High salts / bicarbonates in irrigation water
  – High pH soils in many locations
  – Widely fluctuating winter temperatures
  – Thin rocky soils or heavy clays

Salt crust from irrigation
Limestone soil
Expansive clays
Be Cognizant of Hazardous Plants

Cactus 1: boy 0 (as in Ouch!)
Design Solution to Leaf Raking?

Image Courtesy of a former student
Questions / Comments?

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