Key Plants and Key Pests in Central Florida Landscapes

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Chilli Thrips

Google: Lance Osborne chilli thrips
Red Palm Mite

Google: Lance Osborne red palm mite
Azalea

Rhododendron species
Azalea - Key Pests

**Insects**
- Azalea caterpillar
- Azalea lacebug
- Azalea leafminer
- Rhododendron gall midge
- Spider mites

**Diseases**
- Azalea gall
- Cercospora leaf spot
- Mushroom root rot
- Ovulinia petal blight
- Wet root rots

**Other**
- Iron chlorosis
- Planting depth
Azalea Caterpillar

- Defoliation
- Groups of caterpillars with red heads and posteriors
- Late summer to early fall
Azalea Caterpillar

Management

- Remove and destroy infested branches
- Use B.t. or other insecticides
Azalea Lacebug

- Stippled silvery leaves
- Most severe in full sun locations
Azalea Lacebug

- Insects found on undersides of leaves
- Adults black with lacy wings
- Nymphs have spines and lack wings
- Cool season pest
Azalea Lacebug

Management

- Monitor populations
- Apply insecticides as needed
Azalea Leafminer

- Dry, brown spots on leaves
- Folded leaf tips or margins
- Small yellow-brown caterpillars inside
- Spring and summer
Azalea Leafminer

Management

- Use systemic insecticide when infestation occurs
Rhododendron Gall Midge

- Leaf curling and distortion of new growth
- Witches broom
- On new growth in spring
- Several generations
Rhododendron Gall Midge

Management

• Prune out affected terminals

• Apply insecticides at bud break if problem is recurrent
Spider Mites

- Stippled or bronzed leaves
- Mites, eggs, cast skins, webs visible with hand lens
- Warm and dry conditions favor two-spotted mites
- Cool and moist conditions favor southern red mite
Spider Mites

Management

- Biological control - predatory mites
- Soaps, oils, miticides
Azalea Gall

- Thickened or fleshy leaf galls
- Flower parts hard, fleshy or waxy
- Galls pale green to white, brown with age
- Cool wet spring weather
Azalea Gall

Management

• Remove galls
• Remove mulch in fall if problem is severe
Cercospora Leaf Spot

- Circular or angular dark brown spots
- Chlorosis and leaf drop
- Most prevalent in summer and fall
- Warm temperatures, high humidity
Cercospora Leaf Spot

Management

• Avoid frequent overhead irrigation
• Apply fungicides; cover both leaf surfaces
Mushroom Root Rot

- Slow decline, thinning of canopy
- Desiccation
- White mycellium under bark at soil line
- Wide host range
- Can occur anytime; most symptoms appear in summer
Mushroom Root Rot

Management

- Remove diseased plants and roots
- Fumigate soil before replanting
Ovulinia Petal Blight

- Small, water-soaked spots on petals
- Petals become brown and slimy
- Brown flowers remain on plant
- Occurs during bloom in spring
Ovulinia Petal Blight

Management

- Remove plant litter, use mulch
- Fungicides not practical in most cases
- Fungicides applied weekly during bloom will reduce disease severity
Wet Root Rots

- Poor growth, thinning canopy
- Yellowing and loss of older leaves
- Branch or plant death
- Roots dark and rotted, strip off easily
Wet Root Rots

- Disease triggered by excessive soil moisture
- Contributing factors:
  - Poor drainage
  - Over-watering
  - Planting too deep
  - Shallow rooting
  - Other cultural conditions
Wet Root Rots

Management

- Correct cultural problems
- Apply fungicide if diagnosed early
Iron Chlorosis

- New leaves turn yellow but veins stay green
- High soil pH
- Poor soil aeration or root damage

Management
- Plant selection
- pH adjustment
- Iron applications
Planting Depth

- Chlorosis, slow growth, general decline
- Soil placed over the root ball at planting
- Excessive mulch

Management
- Proper planting depth
- Pull back or remove mulch
Crape Myrtle
*Lagerstroemia indica*
Crape Myrtle
Key Pests

Insects
  • Crape myrtle aphid
  • Metallic beetles

Disease
  • Powdery mildew
Crape Myrtle Aphid

- Sooty mold
- Distorted new growth
Crape Myrtle Aphid

- Yellow, pear-shaped insects with cornicles
- Late spring through fall
- Host specific
Crape Myrtle Aphid

Predator

Management:
- Natural biological control
- Soaps, oils, insecticides
Metallic Beetles

- Small blue beetles
- Leaf notching

**Management:**
None recommended
Powdery Mildew

- White powdery growth on leaves, shoots and buds
- Growth distortion
- Leaf curling
Powdery Mildew

• Cool, dry conditions
• Most severe in shade

Management

• Use resistant varieties
• Apply fungicides when needed
Hibiscus rosa-sinensis
Hibiscus - Key Pests

**Insects**
- Aphids
- Scale
- Spider mites
- Whiteflies
- Mealybug

**Nematodes**
- Root knot

**Diseases**
- Bacterial leaf spots

**Other**
- Environmental stress
Aphids

- Sooty mold
- Distorted new growth
- Pear-shaped insects with cornicles
- Spring and throughout growing season
Aphids

Management

- Natural biological control
- Soaps, oils, insecticides
Scale

- Chlorotic feeding damage on upper leaf surfaces
- Oval or round stationary insects, various colors
- Sooty mold found with soft scale

White peach scale
Scale

- Year round occurrence
- Crawlers spring through fall

Management
- Natural biological control
- Oils or insecticides

Nigra scale
Spider Mites

- Stippled or bronzed leaves
- Mites, eggs, cast skins, webs visible with hand lens
- Warm and dry conditions favor two-spotted mites
- Cool and moist conditions favor southern red mite
Spider Mites

Management

- Biological control - predatory mites
- Soaps, oils, miticides
Whiteflies

- Leaves pale or spotted
- Sooty mold
- Adults are tiny, white, moth-like
- Nymphs are translucent yellow ovals

Citrus whitefly  Silverleaf whitefly
Whiteflies

- Giant whitefly
- Larger
- Obvious waxy filaments
Whiteflies

Management

• Silverleaf and giant whitefly are very difficult to control
• Biological control
• Soaps, oils, insecticides
Bacterial Leaf Spot

- Angular spots with dark margins, yellow halos
- Water soaked appearance
- Leaves turn yellow and drop
- Warm temperatures, wet leaves favor disease
Bacterial Leaf Spot

Management

• Avoid overhead irrigation at night
• Improve air circulation
Root Knot Nematodes

- Decline and thinning of canopy
- Roots may be brown, stunted and galled

Management
- Provide adequate water and fertilizer
- Remove and replace plants and soil
- Fumigate or replace with tolerant species
Environmental Stress

- Flower buds drop before opening
- Leaves turn yellow and may drop
Environmental Stress

Causes

- Response to injury or stress
- Insects or nematodes
- Excessive water or fertilizer
- Cold temperatures

Management

- Correct cultural problems
- Provide cold protection
- Prune and re-grow
Holly
Ilex species
Holly - Key Pests

Insects
- Florida wax scale
- Tea Scale

Diseases
- Cylindrocladium leaf spot
- Dieback
- Fusarium root rot
- Sphaeropsis gall

Nematodes
- Root knot

Other
- Magnesium deficiency
Florida Wax Scale

- Mature scale round, convex, creamy
- Immatures darker with white fringe
- Sooty mold indicator
- Chlorotic spots, leaf drop
Florida Wax Scale

- Mature scale present year round
- Monitor crawlers spring - summer

Management
- Natural biological control
- Soaps, oils, insecticides
Tea Scale

- Chlorotic feeding damage on leaves
- Undersides of leaves white with waxy threads
- Tiny, armored scales
- Mature scale present year round
Tea Scale

Management

- Conserve natural biological control
- Soaps, oils, insecticides
Cylindrocladium Leaf Spot

- Dark purple to black circular leaf spots
- Leaf drop, twig dieback
Cylindrocladium Leaf Spot

- Most common on *I. vomitoria*
- Also occurs on *I. crenata, I. cornuta, I. opaca*
- Warm temperatures, high humidity
- Spreads by splashing water

Management

- Adjust irrigation to keep foliage dry
- Remove fallen leaves, rogue infected plants
- Fungicides
Dieback

- Holes or bare areas in plant
- Most common in yaupon holly
- Spreads by splashing water
- Injuries allow points of entry
- Occurs most often in dense or excessively sheared plantings
Dieback

• Can be caused by several fungi
• Fungal signs may not be apparent

Management
• Prune out below symptoms
• Plant replacement
• Fungicides after pruning may limit new infections

Pink limb blight
Sphaeropsis Gall

- Swellings on young twigs
- Irregular galls on older wood
- Witches broom
- Horizontal branches “tip up”
- Dieback
Sphaeropsis Gall

- Most severe on ‘East Palatka’ and ‘Savannah’
- May spread rapidly by pruning

**Management**

- Prune below symptoms
- Don’t prune when rainfall expected
- Sterilize pruners
- Fungicides after pruning may limit new infections
- Remove severely infested plants
Root Knot Nematodes

- Decline and thinning of canopy
- Roots may be brown, stunted and galled
- Susceptibility varies by species

Management
- Provide adequate water and fertilizer
- Remove and replace plants and soil
- Fumigate or replace with tolerant species
Magnesium Deficiency

- Distinct yellow, inverted V pattern
- Occurs on mature leaves
- Low soil pH
- Lack of soil Mg

Management

- Check and adjust pH with dolomite
- Apply Epsom salts or Mg fertilizers
Indian Hawthorn
Raphiolepis indica
Indian Hawthorn
Key Pests

Insects
  • Florida wax scale

Diseases
  • Entomosporium leaf spot
Florida Wax Scale

- Mature scale round, convex, creamy
- Immatures darker with white fringe
- Sooty mold
- Chlorotic spots, leaf drop
Florida Wax Scale

- Present year round
- Monitor crawlers spring - summer

Management
- Natural biological control
- Soaps, oils, insecticides
Entomosporium Leaf Spot

- Dark leaf spots with purple borders
- Growth distortion
- Leaf drop
- New growth flushes most susceptible
- Optimum temperature 59-77° F
- 9-12 hours leaf wetness or high humidity
Entomosporium Leaf Spot

Management

- Minimize overhead irrigation, especially at night
- Improve air circulation
- Maintain low fertility level
- Rotate systemic and protectant fungicides
Juniper - Key Pests

Insects
• Spider mites
• Webworm

Diseases
• Mushroom root rot
• Rhizoctonia web blight
• Tip blight
• Wet root rots
Spider Mites

- Pale or off-color foliage
- Mites, eggs, cast skins, webs visible with hand lens
- Two-spotted spider mites (warm and dry)
- Southern red mites (cool and moist)
- Spruce mites (winter)
Spider Mites

Management

- Biological control - predatory mites
- Soaps, oils, miticides

Two-spotted spider mite

Southern red mite
Webworm

*Glyphidocera juniperella*

- Individual branches turn red and die
- Webbing holds foliage and soil together at base of stem
- Girdled bark
Webworm

- Ground cover types of juniper affected most often
- Girdling damage occurs in winter, symptoms show in spring

Management

- Remove dead branches
- Insecticides
Mushroom Root Rot

- Slow decline, thinning of canopy
- Gray-green color
- White mycelium under bark at soil line
- Wide host range
- Associated with old plantings
Mushroom Root Rot

Management

- Remove diseased plants and roots
- Fumigate soil before replanting
Rhizoctonia Web Blight

- Random areas of dead foliage
- Both new and old growth affected
- Threadlike mycellium visible with hand lens
Rhizoctonia Web Blight

- Soil-borne fungus, splashes into canopy
- Hot, wet weather

**Management**

- Minimize overhead irrigation
- Improve air circulation
- Approved fungicides
Tip Blight

- Tips turn gray-green to tan to ashy gray
- Progresses from tip backwards
- Black reproductive structures visible with hand lens
Tip Blight

- Young plants affected
- May follow other stresses
- High humidity and cool temperatures (75°F)
- Higher temperatures (79-90°F) favor disease development
- Required for spore germination

Tip Blight
Tip Blight

Management

- Plants usually outgrow the disease
- Prune out severe damage
- Use approved fungicides on new plantings
Wet Root Rots

- Off-color foliage, oldest foliage first
- Branch or plant death, may be one-sided
- Roots dark and rotted, strip off easily
Wet Root Rots

• Disease triggered by excessive soil moisture

• Contributing factors:
  • Poor drainage
  • Over-watering
  • Planting too deep
  • Shallow rooting
  • Other cultural conditions
Wet Root Rots

Management

- Correct cultural problems
- Apply fungicide if diagnosed early
Ligustrum

L. sinense

(L. LL. japonicum)
Ligustrum - Key Pests

Insects
• White peach scale

Diseases
• Cercospora leaf spot
• Corynespora leaf spots
• Mushroom root rot
• Wet root rots
White Peach Scale

- Heavy infestation forms white crust on stems and twigs
- Common pest on *L. sinense*, not *L. japonicum*
Cercospora Leaf Spot

- Typical on older plantings of *L. japonicum*
- Poor plant health, dense plantings, shade
- Predominant in late summer and fall
Cercospora Leaf Spot

Management

- Reduce leaf wetness
- Avoid excessive pruning; provide adequate fertilizer and water
- Use approved fungicides; spray both leaf surfaces
Corynespora Leaf Spot

- Small round leaf spots, red to brown with purple borders
- Leaf drop
- Warm, moist conditions
- Only *L. sinense* is susceptible

Management

- Minimize leaf wetness
- Improve air circulation
- Use approved fungicides when necessary
Mushroom Root Rot

- Slow decline, thinning of canopy
- Desiccation
- Wide host range
Mushroom Root Rot

- White mycellium at soil line
- Mushrooms sometimes seen

Management
- No control on existing plants
- Soil fumigation before planting
Wet Root Rots

- Off-color foliage, oldest foliage first
- Branch or plant death; may be one-sided
- Roots dark and rotted, strip off easily
Wet Root Rot

- Disease triggered by excessive soil moisture
- Contributing factors:
  - Poor drainage
  - Over-watering
  - Planting too deep
  - Shallow rooting
  - Other cultural conditions

Management
- Correct cultural problems
- Apply fungicide if diagnosed early
Southern Magnolia

*Magnolia grandiflora*
Magnolia - Key Pests

Insects

- Black twig borer
- Magnolia white scale

Diseases

- Algal leaf spot
Black Twig Borer

- Conspicuous twig dieback
- Twigs break off
- Entrance holes on undersides of twigs
- Problem is primarily aesthetic
- Prune out and destroy infected twigs
Magnolia White Scale

- White armored scales, yellow-brown bodies underneath
- Clustered along midrib or scattered on both leaf surfaces
- Feeding damage causes yellow spots
Magnolia White Scale

- Adults present year-round
- Eggs and crawlers visible with hand lens

Management

- Mature trees usually do not require treatment
- Monitor parasitism
- Time contact insecticides to target crawlers
- Systemic insecticides for severe infestations
Algal Leaf Spot

- Silvery gray, green or tan raised spots
- Most damaging on slow-growing, weakened plants
- No fungicides recommended
Oak

Quercus species
Oak - Key Pests

Insects
- Borers
- Caterpillars
- Insect-induced galls
- Twig girdler

Diseases
- Oak leaf blister
- Root and butt rots
- Tubakia leaf spot

Other
- Mistletoe
- Psocids
- Spanish moss
Borers

- Foliage discoloration, wilting, branch dieback
- Small holes in trunk
- Sap staining, sawdust or pellets on bark or at base of tree
- Tunnels may be seen if bark is removed
- Trees affected are generally weakened or wounded by another factor

Flathead borers
Roundhead borers
Ambrosia beetles
Clearwing moths
Carpenter worms
Borers

Management

• Keep trees healthy to prevent infestation
• Prune out dead and dying branches
• Remove and destroy severely infested trees
• Trunk applications of insecticides on nearby trees
Caterpillars

- Holes or jagged edges in leaves, sometimes complete defoliation
- Caterpillars visible in trees, understory shrubs, on walls or other surfaces
- Pellets of frass under trees
Caterpillars

- Often occur after leaf emergence in spring
- Many types have one generation per year, others two to four
- Levels of infestation vary from year to year; outbreaks occur occasionally
Caterpillars

Management

• Populations usually kept in check by weather and natural enemies
• Feeding rarely causes serious damage to healthy trees
• Remove and destroy webs
• Approved insecticides may be used if necessary
Insect-induced Galls

- Galls occur in many forms, colors and shapes
- Plant response to egg-laying or feeding by wasps, midges, mites and others
- Small exit holes on outside of gall
Insect-induced Galls

Management

- Select gall-free plants for installation
- Leaf galls are harmless
- Prune out stem or branch galls if possible
Twig Girdler

- Wilted or dead twigs hanging in trees or on the ground
- Severed ends whittled to a dull point
- Damage occurs in the fall
Twig Girdler

- Beetle is seldom seen

Management

- Collect and destroy twigs from the ground
- No insecticidal control usually warranted
Oak Leaf Blister

- Raised or wrinkled blisters on new leaves
- Distortion of newly expanding leaves
- Brown necrotic areas on leaves later in season
- Infection occurs during mild, rainy spring weather

Management

- Fungicide use not recommended
- Rake fallen leaves to reduce inoculum
Root and Butt Rots

- Crown dieback, foliage discoloration, leaf drop
- Shelf fungi or mushrooms at or near base of tree
- Construction damage to roots or trunk
- Poor soil conditions
- Old age
Root and Butt Rots

Management

- Proper planting and establishment
- Avoid wounds to trunk
- Protection during construction activities
- Do not allow soil grade changes
- Remove fruiting bodies to reduce spread
- Consider soil replacement or fumigation if replanting
Tubakia Leaf Spot

- Numerous small, brown leaf spots
- Leaf distortion on new growth
- Frequent overhead irrigation or rainfall
- Laurel and shumard oaks are susceptible; live oak is not

Management

- Avoid overhead irrigation of susceptible species
- Fungicides effective but not usually practical
Mistletoe

- Parasitic plant
- Usually noticed when oaks lose leaves in spring
- Seeds spread by birds
- Other hosts include pecan, hickory, other hardwoods

Management
- Prune at least 1 foot below attachment
Psocids

- Herds of small insects move actively on tree trunks or branches
- Tree may be covered with webbing
- Insects feed on lichens and fungi; cause no harm to plants
Spanish Moss

- Easily recognized moss hanging from branches of trees
- May be prolific on trees which have thinned from other causes of decline
- Epiphytic, not parasitic

Management

- Unnecessary in most cases
- If desired, remove mechanically
Oleander
Nerium oleander
Oleander - Key Pests

**Insects**
- Oleander aphid
- Oleander caterpillar

**Disease**
- Sphaeropsis gall
Oleander Aphid

- Bright yellow insects clustered on new growth
- Leaf distortion, stunting
- Pest is specific to oleander and milkweed

Management

- Natural biological control
- Soaps, oils, insecticides
Oleander Caterpillars

- Orange caterpillars with tufts of black hairs
- Adult blue-black moth with white spots and red abdomen
- Caterpillars cause severe defoliation
- Pest is specific to oleander
Oleander Caterpillar

Management

- Use B.t. when small or other approved insecticides
- Prune away infestation early
Sphaeropsis Gall

- Swellings, galls, dieback or witches broom
- Wounds allow point of entry
- May spread rapidly by pruning
Sphaeropsis gall

Management

- Prune below symptoms
- Don’t prune when rainfall expected
- Sterilize pruners
- Fungicides after pruning may limit new infections
- Remove severely infested plants
Palms

*Palmaceae*
Palms - Key Pests

Insects
- Palm leaf skeletonizer
- Palmetto weevil
- Scale

Diseases
- Bud rots
- Fusarium wilt
- Ganoderma butt rot
- Leafspots
- Thielaviopsis

Other
- Magnesium deficiency
- Manganese deficiency
- Potassium deficiency
- Planting depth
Palm Leaf Skeletonizer

- Small caterpillars feed on leaf surfaces causing necrotic areas
- Brown, fibrous excrement

Management

- Use neem or approved insecticides (Talstar) if caterpillars are present
- Prune out severe damage if desired
Palmetto Weevil

- Symptoms range from brown fronds to loss of top
- Center spear pulls loose easily
- Tunnels, entrance holes, frass may be found externally
- Weevils attracted to stressed palms
- Sabal and Canary Island Date palms most susceptible
Palmetto Weevil

- Large grubs, pupal cases and/or adults
Palmetto Weevil

Management

• Reduce transplant stress
• Preventative insecticide applications
• Remove and destroy infected palms
Scale

- Armored or soft scales
- Often occurs in areas of shade or poor air circulation
Scale

Management

- Tolerate minor infestations
- Monitor parasitism

- Time contact insecticides for crawlers
- Systemic insecticides for severe infestations
Bud Rots

- Collapse or browning of young fronds
- Affected leaves pull easily
- Possible foul odor
- May be fungal or bacterial
- Often follows cold damage or high rainfall
Bud Rots

Management

- Remove and destroy affected palms
- Preventative use of approved fungicides drenched into bud
Fusarium Wilt

- One-sided decline of fronds
- Streaking of rachis
- Vascular discoloration
- *Phoenix* and *Washingtonia* species susceptible
- Spreads through pruning and infested soil
Fusarium Wilt

Management

• Purchase disease-free palms
• Sterilize pruning tools
• Affected trees will die, there is no treatment
• Remove and destroy
Ganoderma Butt Rot

- Withering and drooping of older fronds; new fronds small and pale
- Bud dies, top may collapse
- Shelf fungus may be present on trunk
- Fungus enters through trunk or root wounds
Ganoderma Butt Rot

Management

- Avoid wounding trunks
- Hand remove conks to prevent spread
- Remove and destroy infected palms
- Replant with another species
Leaf Spots

- Helminthosporium
- Pestalotiopsis
- Graphiola
- Stigmina
Leaf Spots

- Periods of leaf wetness
- Shade or poor air circulation
- Stigmina occurs during cool season; others favored by warm temperatures

Management

- Limit overhead irrigation
- Prune out infected fronds
- Preventive use of approved fungicides
Thielaviopsis Trunk or Bud Rot

- New leaves deformed with black tips
- Reduced growth rate, defoliation, death
- Bleeding from trunk
- Trunk is hollow, palms may blow over or snap
Thielaviopsis
Trunk
or Bud Rot

- Many species susceptible
- Soil-borne fungus enters through wounds, cracks
Magnesium Deficiency

- Occurs on oldest fronds first
- Broad yellow band along leaf margins, green toward rachis
- Tips may become necrotic
Magnesium Deficiency

- Most common in *Phoenix* species
- Occurs on sandy soils with low cation exchange capacity

Management
- Prevent by using palm fertilizer with magnesium
- Correct with MgSO\(_4\) applied to soil four times/year
Manganese Deficiency

- “Frizzle top”
- New leaves emerge chlorotic, small, necrotic
- Death of bud may follow
- Common on alkaline soils
- Poor drainage, root damage, cold temps can induce deficiency
Manganese Deficiency

Management

- Prevent by using palm fertilizer with manganese
- Correct cultural problems
- Adjust soil pH where practical
- Soil and/or foliar applications of MnSO₄
Potassium Deficiency

- Starts on older leaves, progresses to younger leaves
- Symptoms differ with species
- Yellow or orange spots
- Necrosis along margins
- Entire leaves become frizzled, midrib remains alive
- Date palms show orange-brown discoloration, necrotic leaf tips
Potassium Deficiency

Management

- Fertilize with slow-release forms of K
- Apply KSO$_4$ to soil four times per year
- Apply half as much MgSO$_4$ to prevent imbalance
Planting Depth

- Lack of vigor
- Decline over several years
- Symptoms similar to deficiencies or root rot
- Aggravated by poor drainage
Fusarium Decline
Texas
Phoenix
Palm
Decline
Photinia - Key Pests

Insects
  • Aphids

Disease
  • Entomosporium leaf spot

Other
  • Magnesium deficiency
Aphids

Pear-shaped insects with cornicles
Sooty mold
Distorted new growth
Spring and throughout growing season

Management

Natural biological control
Soaps, oils, insecticides
Entomosporium Leaf Spot

- Dark leaf spots with purple borders
- Growth distortion
- Leaf drop
- Optimum temperature 59-77°F
- Extended leaf wetness or high humidity
Entomosporium Leaf Spot

Management

• Minimize overhead irrigation, especially at night
• Improve air circulation
• Maintain low fertility level
• Rotate systemic and protectant fungicides
Magnesium Deficiency

- Distinct yellow inverted V pattern occurs on mature leaves.
- Low soil pH
- Lack of soil Mg
- May be induced by root constriction or damage.
- Low soil pH
- Lack of soil Mg
- May be induced by root constriction or damage.
Magnesium Deficiency

Management
• Correct cultural problems
• Check and adjust pH with dolomite
• Apply Epsom salts or Mg fertilizers
Pine

Pinus species
Pines - Key Pests

**Insects**
- Borers
- Pine bark beetles
- Pine sawflies
- Pine tip moths

**Diseases**
- Fusiform rust

**Other**
- Pine chlorosis and decline
Borers

- Branch wilt and dieback
- Holes, sap staining or sawdust
- Trees weakened or wounded by other factors
Borers

Management

• Keep trees healthy to prevent borers
• Remove infested or highly susceptible trees
• Trunk sprays of insecticides on nearby trees
Pine Bark Beetles

- Pitch tubes and/or boring dust on bark
- Foliage color changes to yellow to orange-brown
- Attracted to weak or wounded trees
- Southern pine beetles (SPB) may infect healthy trees
Pine Bark Beetles

- Adults bore through bark and construct egg galleries
- Larvae tunnel in inner bark
Pine Bark Beetles

Management

• Minimize tree stress, avoid root injury
• Remove weak or infested trees
• Insecticide application to trunk may protect healthy trees from SPB
Pine Sawflies

- Larvae look like caterpillars
- Large numbers feed on pine needles
- Stubby, tufted appearance of pine shoots
- Cyclical; 8-10 year intervals
- All pine species susceptible
**Pine Sawflies**

**Management**

- Populations usually controlled by natural enemies
- Use approved insecticides during outbreaks
- Promote recovery after attack and watch for bark beetles
Pine Tip Moth

- Needle drop, dying tips, color change
- Webbing and resin at shoot tips
- 3-5 generations per year
- Slash pine most susceptible
- Damage occurs most often on young trees
Pine Tip Moth

Management

- Damage is mostly aesthetic
- Prune out damaged tips if desired
- Systemic insecticides on high value trees
Fusiform Rust

- Spindle shaped galls on branches or stems
- Bright yellow blisters in spring
- Fungus must spend part of life on pines, part on oak
Fusiform Rust

Management

- Prune branches below galls
- Remove trees with galls on branches or main trunks
Pine Chlorosis and Decline

- Gradual yellowing of foliage
- Thinning of crowns or dieback
- Associated with intensive management practices or site disturbances
Pine Chlorosis

Management

- Mulch pine stands
- Keep maintenance activities and irrigation away
- Soil acidification or micronutrients may help
- Tree injection in some cases
Pittosporum
Key Pests

Insects
• Aphids
• Cottony cushion scale
• Spider mites

Diseases
• Aerial blight
• Alternaria leaf spot
• Angular leaf spot
• Galls, dieback, and stem blights
• Southern blight
• Wet root rot diseases

Nematodes
Aphids

Management
• Natural biological control
• Soaps, oils, insecticides

• Sooty mold
• Distorted new growth
• Pear-shaped insects with cornicles
• Spring and throughout growing season
Cottony Cushion Scale

- White or yellow cottony insects on stems
- Sooty mold
- Reduced plant vigor, twig dieback possible
Management

- Prune out small infestations
- Encourage natural controls
- Apply approved insecticides
Spider Mites

- Stippled or bronzed leaves
- Mites, eggs, cast skins, webs visible with hand lens
- Warm and dry conditions favor two-spotted mites
- Cool and moist conditions favor southern red mite

Two-spotted spider mite  Southern red mite
Spider Mites

Management

- Biological control - predatory mites
- Soaps, oils, miticides
Aerial Blight

- Brown, irregular spots on leaves
- Threadlike mycelium visible with hand lens
- Dead leaves remain on plant
- Hot, wet weather
- Fungus is soil-borne, splashes into canopy
Aerial Blight

Management

- Minimize overhead irrigation
- Improve air circulation
- Collect and destroy diseased leaves
- Prune severely infected branches
- Use approved fungicides

(YFL plate 232)
Alternaria Leaf Spot

- Small round chlorotic spots
- Distortion or crinkling of new growth
- Warm, wet conditions
Alternaria Leaf Spot

Management

- Minimize overhead irrigation, especially at night
- Improve air circulation
- Fungicides may be necessary
- Coverage of both leaf surfaces essential
Angular Leaf Spot

- Light yellow to tan angular spots
- Leaf distortion
- Older leaves may drop
- Warm, wet conditions favorable
Angular Leaf Spot

Management

- Minimize overhead irrigation, especially at night
- Improve air circulation
- Fungicides may be necessary
- Coverage of both leaf surfaces essential
Galls, Diebacks and Stem Blights

Many organisms cause stem galls, wilting, or diebacks including

- Bacterial crown gall
- Nectriella and Sphaeropsis galls
- Diplodia and Phomopsis diebacks
- Pink limb blight
Galls, Diebacks and Stem Blights

- Pathogens enter through wounds or splits
- Spread by air, water, pruning tools

Management

- Prune out affected branches
- Sterilize pruning tools
- Removal of entire plants may be necessary

Nectriella gall

Pink limb blight
Southern Blight

- Wilting, stem rot, and death of plant
- Coarse white mycelium and sclerotia visible at soil line
- Hot, wet conditions favorable
Southern Blight

Management

- Remove infected plants
- Fumigate if possible before replanting
- Fungicides not effective
Wet Root Rots

• Disease triggered by excessive soil moisture

• Contributing factors:
  • Poor drainage
  • Over-watering
  • Planting too deep
  • Shallow rooting
  • Other cultural conditions
Wet Root Rots

- Poor growth, thinning canopy
- Yellowing and loss of older leaves
- Branch or plant death
- Roots dark and rotted, strip off easily

Management
- Correct cultural problems
- Apply fungicide if diagnosed early
Root Knot Nematodes

- Decline and thinning of canopy
- Roots have obvious galls
- Roots may be brown and stunted
Root Knot Nematodes

Management

- Adequate water and fertilizer to support new roots
- Remove and replace plants and soil
- Fumigate or replace with non-susceptible species
Sago
Cycas Revoluta
Sago Palm - Key Pests

Insects
- Mealybugs
- Scale

Other
- Manganese deficiency
Mealybugs

- Cottony appearance on stems and leaves
- Discoloration and/or deformed foliage
- Sooty Mold

Management

- Encourage natural enemies
- Use approved insecticides if necessary
Scale

- Yellow spots on leaves
- Magnolia white scale or other species

Management

- Monitor parasitism
- Time contact insecticides for crawlers
- Systemic insecticides for severe infestations
Cycad Scale
Cycad Scale

Management

- Neonicotinoid (Safari)
- Horticulture oil
Manganese Deficiency

• Yellow-brown spots or streaks
• New fronds small and distorted
• Contributing factors:
  • High soil pH or insufficient manganese
  • Root restriction or rot
  • Poor drainage
  • Over or under watering
  • Recent transplanting
**Manganese Deficiency**

**Management**
- Check site conditions
- Fertilize regularly with manganese
- Foliar applications if deficiency occurs
- Soil applications for long term correction
Sycamore

Platanus occidentalis
Sycamore - Key Pests

Insects

- Sycamore lacebug

Diseases

- Bacterial scorch
- Powdery mildew
Sycamore Lacebug

- Yellow or bronze foliage
- Blotchy or stippled pattern on leaves
- Specific to sycamore, hickory, ash
- Occurs in mid to late summer
- Leaves drop prematurely
Lacebugs

- Small insects with lacy wings on undersides of leaves
- Nymphs are darker and wingless

Management

- Tolerate damage
- Leaves will drop naturally
- Tree injection where cost is justified
Bacterial Scorch

- Olive green discoloration
- Leaves turn brown and crisp, remain attached
- Begins on older leaves, progressing towards branch tips
Bacterial Scorch

• Bacteria is transmitted by insects
• Scorch symptoms appear during hot, dry weather
• Dieback is prevalent in spring

Management
• Minimize moisture stress
• Prune out individual branches
Powdery Mildew

- White powdery growth on leaf surfaces
- Leaf curling and distortion
- Cool dry weather
- Spring and fall

**Management**

- Use approved fungicides on small trees
**Viburnum**

*V. odoratissimum, V. suspensum*
Viburnum - Key Pests

Insects

- Aphids
- Spider mites
- Thrips
- Whiteflies

Disease

- Mushroom root rot
Aphids

- Pear-shaped insects with cornicles
- Sooty mold
- Distorted new growth
- Spring and throughout growing season

Management

- Natural biological control
- Soaps, oils, insecticides
Spider Mites

- Stippled or bronzed leaves
- Mites, eggs, cast skins, webs visible with hand lens
- Southern red mites most common
- Cool and moist conditions favorable

Management

- Natural biological control
- Soaps, oils, miticides
Thrips

- Flecked, bleached or silvered appearance
- Spots of shiny black excrement
Thrips

- Adults tiny, black, elongated
- Nymphs translucent
- Peak during spring

Management

Use insecticides for severe infestations
Whiteflies

- Leaves pale or spotted
- Sooty mold
- Adults are tiny, white, moth-like
- Nymphs are translucent yellow ovals

Citrus whitefly

Silverleaf whitefly
Whiteflies

Management

- Biological control
- Soaps, oils, insecticides
- Silverleaf is more difficult to control
Mushroom Root Rot

- Slow decline, thinning of canopy
- Desiccation
- White mycelium under bark at soil line
- Wide host range
- Can occur anytime; most symptoms appear in summer
Mushroom Root Rot

Management

- Remove diseased plants and roots
- Fumigate soil before replanting
Wax Myrtle

*Myrica cerifera*
Wax Myrtle - Key Pests

**Insects**
- Eriophyid mites

**Diseases**
- Fusarium wilt
- Inonotus heartrot

**Nematodes**
Eriophyid Mites

- Leaf curling, distortion
- Discoloration, russetting
- Blisters or galls on leaves
- Host specific
Eriophyid Mites

Management

- Tolerate damage
- Symptoms may persist after mites have gone
- Prune and dispose of infested plant parts
- Specific miticides if necessary
Fusarium Wilt

- Loss of vigor, stunting
- Curled, wilted foliage and branch dieback
- Fungus is soil-borne
- Nematodes or wounds allow entry
- Purple discoloration of xylem in cross section of base
Fusarium Wilt

Management

- Minimize root damage during planting and maintenance
- Inspect before installing
- Remove and replant with other species
- Fumigate only if replanting with wax myrtle
Inonotus Heartrot
Ptychogaster Wood Rot

- Wilting, dieback, loss of vigor, bleeding, bark staining
- Orange beard-like structures near wounds
- Branches may break easily
- Internal decay
Inonotus Heartrot
Ptychogaster Wood Rot

• Fungus is air-borne, enters through wounds
• Associated with manicured, heavily pruned wax myrtle

Management
• Minimize pruning and other causes of bark injury
• Inspect before installing
• Remove and replace infected plants
• Soil fumigation not necessary
Root Knot Nematodes

- Decline and thinning of canopy
- Roots have obvious galls
- Roots may be brown and stunted
Root Knot Nematodes

Management

• Provide adequate water and fertilizer
• Remove and replace plants and soil
• Fumigate or replace with non-susceptible species
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Thanks for your attention!