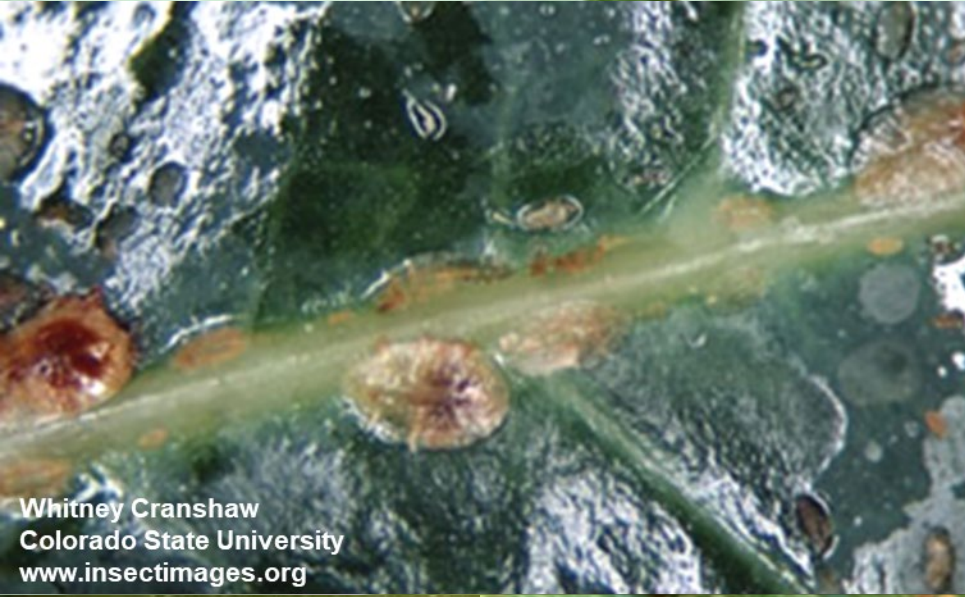


Managing scale insects



Whitney Cranshaw
Colorado State University
www.insectimages.org



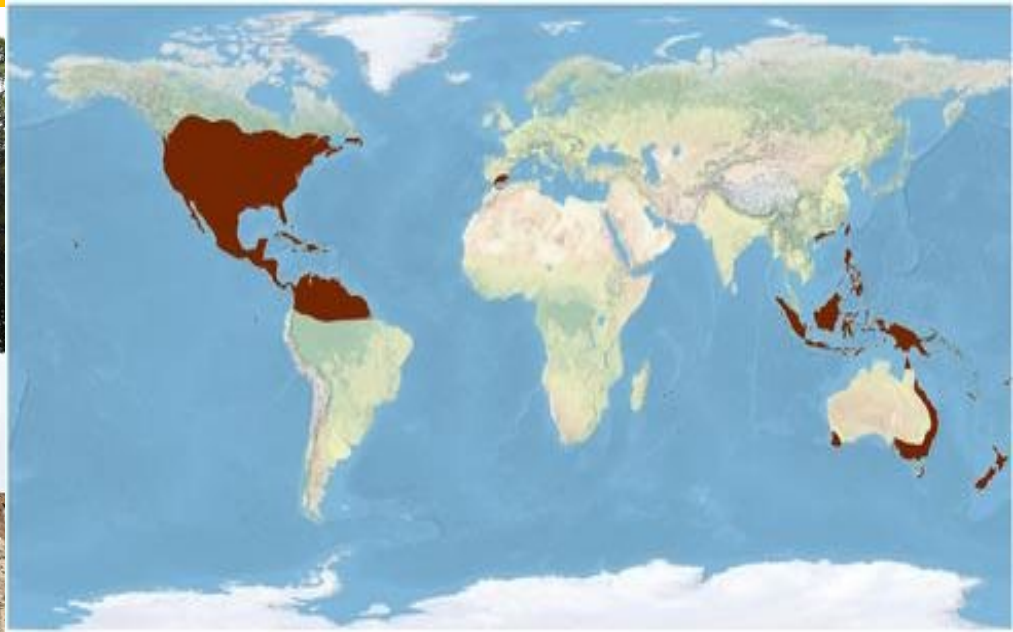
**Dr. Vera Krischik AND Dr. Carrie Deans,
Department of Entomology, University of Minnesota
krisc001@umn.edu**

Do we send invasive, exotic around the world from the US? YES

2015 Japanese beetle is a serious pest in mainland Europe; at two airports in northern Italy at Piedmont and Lombardy, feeding on both wild plants and nearby crops.

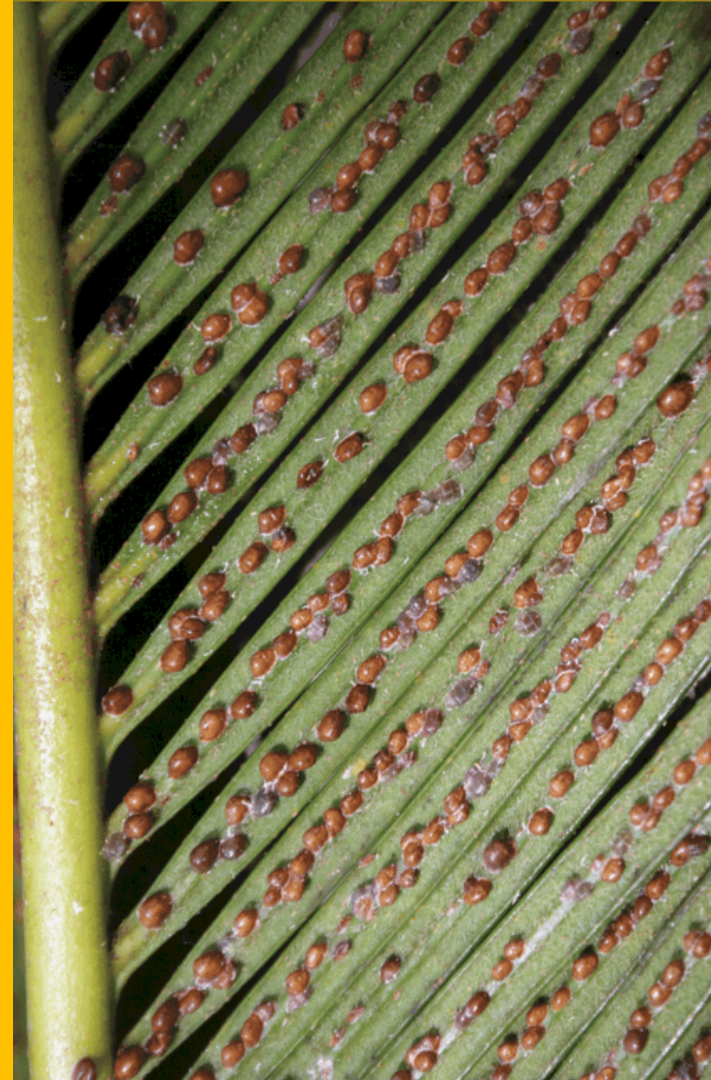
2020 Pine tortoise scale invades umbrella pines in Rome

1840 Monarch butterflies in Hawaii, Australia, New Zealand, Spain, Pacific Islands, and International Space Station!!



Taxonomy of scales

- Order Hemiptera, formerly placed in order Homoptera
- related to aphids/mealybugs
- Diaspididae, armored scales
- Coccidae, soft scales
- Eriococcidae, felt scales



Life-history traits of armored scales (Diaspididae) and soft scales (Coccidae, Eriococcidae)

	ARMORED SCALE	SOFT SCALE
soft cover attached to the scale	no	yes
eggs laid in sac-like structure	yes	yes
overwintering stages	eggs/mated	mated/2nd
seasonal time for crawlers	late Apr/June	Apr/Aug
ability to move after crawler stage	no	yes
honeydew production	no	abundant
feeding site on the plant	parenchyma	phloem

Soft scales (Coccidae, Eriococcidae)

GH soft scales

brown soft scale

black scale

hemispherical scales

Landscape soft scales

cottony maple scale

European fruit lecanium scale

Fletcher scale

pine tortoise scale

spruce bud scale

tuliptree scale

calico scale

Felt scales, Eriococcidae

European elm scale

Armored scales (Diaspididae)

GH armored scles

Boisduval scale

Fern scale

Landscape armored scales

black pineleaf scale

euonymus scale

gloomy scale

juniper scale

obscure scale

oystershell scale

pine needle scale

scurfy scale

Managing scale insects

1. To get rid of scale insects prune and dispose of infested branches, twigs and leaves.
2. When scale numbers are low they may be rubbed or picked off of plants by hand.
3. Dabbing individual pests with an alcohol-soaked cotton swab or neem-based leaf shine will also work when infestations are light.

Double side tape for crawlers

Use IGR, Insect growth regulators, carbaryl

Imidacloprid, Marathon liquid, granular

armored scales

Dinotefuran, Safari, not imidacloprid, Marathon

Managing scale insects with BC

Common name	Trade name	Mode of action
Fenoxycarb	Preclude	Juvenile Hormone Mimic
Kinoprene	Enstar II/AQ	Juvenile Hormone Mimic
Distance	Pyriproxyfen	Juvenile Hormone Mimic
Crymomazine	Citation	Chitinase Inhibitor
Extoxazol	Tetrasan	Chitinase Inhibitor
Novaluron	Pedestal	Chitinase Inhibitor
Azadiractin	Azatin, Ornazin	Ecdysone Antagonist

Eriococcid, felt scale



summer adult female with crawlers

European elm scale scale: elm

Soft scale



summer male



summer female
and crawlers

Tuliptree scale: linden, walnut

Soft scale



summer females



male covers

Tuliptree scale: linden, walnut

Armored scale



spring
adult females and males



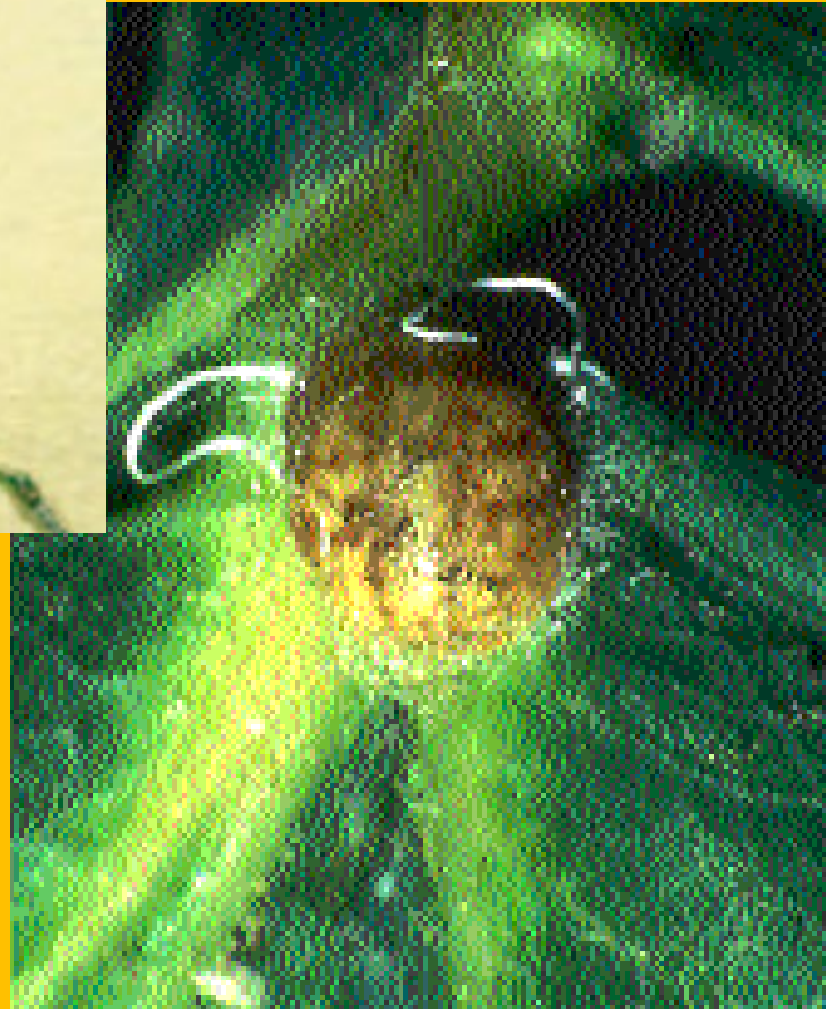
males

Euonymus scale: euonymus

gall-like scale



summer females



**Pin oak kermes,
Pubescent kermes scale: oak**

Characteristics of armored and soft scales

- Long stylets for feeding
 - Males have different shaped covers
 - Males look like winged aphids
 - Crawler stage
 - High density can kill branches
 - Oils, chlorpyrifos
 - Imidacloprid (soft only)
 - Egg, crawler, nymph, immature, adult

Life-history traits of armored scales (Diaspididae) and soft scales (Coccidae, Eriococcidae)

	ARMORED SCALE	SOFT SCALE
soft cover attached to the scale	no	yes
eggs laid in sac-like structure	yes	yes
overwintering stages	eggs/mated	mated/2nd
seasonal time for crawlers	late Apr/June	Apr/Aug
ability to move after crawler stage	no	yes
honeydew production	no	abundant
feeding site on the plant	parenchyma	phloem

Soft scales **(Coccidae, Eriococcidae)**

SOFT SCALES

calico scale

cottony maple scale

European fruit lecanium scale

Fletcher scale

pine tortoise scale

spruce bud scale

tuliptree scale

FELT SCALES

European elm scale (Eriococcidae)

Brown Soft Scale

Coccus hesperidum

Order Hemiptera

Family Coccidae

Description: Females are 2.5 to 4 mm long, yellowish to brown, often mottled. Crawlers and nymphs are yellow. Males are winged.

Hosts: Hundreds of plants, especially perennials and ferns.

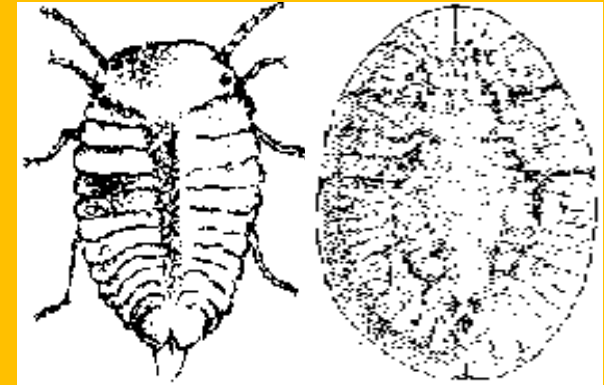


Crawlers and females

Brown Soft Scale

Life History: Crawlers are born under female covers.

Damage: Stunted growth, wilting, leaf drop, honeydew, sooty mold.



**Crawler (L) and
adult female**

**Brown soft
scale on *Ficus*.
Note the shiny
honeydew
secretions.**



Whitney Cranshaw
Colorado State University
www.insectimages.org

Brown Soft Scale

Monitoring: Look for insects and damage.

Cultural Control: Remove infested plants.

Chemical Control: Oils or systemic insecticides such as imidacloprid. Control is difficult because waxy coverings protect the insects.

**Brown soft scale
and scale cover with
parasitoid exit hole**



Jack Kelly Clark
University of California

Brown Soft Scale

Biological Control: Lady beetles *Rhyzobius lophanthae*, *Chilocorus orbus*, and *C. cacti* and parasitic wasps *Metaphycus helvolus* and *M. luteolus*.



Jack Kelly Clark
University of California

Jack Kelly Clark
University of California

Chilocorus orbus

Rhyzobius lophanthae

Hemispherical Scale

<http://www.landcareresearch.co.nz/research/biodiversity/invertebratesprog/softscales/fauna/coffeeae.asp>

Saissetia coffeae

Order Hemiptera

Family Coccidae

Description: Females are 2 to 4.5 mm long; hemispherical, brown, s

Young females may have ridges in the form of the letter “H.” Crawlers are pinkish beige.

Hosts: Many plants, including bamboo, croton, camellia, crape myrtle, chrysanthemum, fern, fig, gardenia, honeysuckle, lily, orchid, zamia.



Hemispherical Scale

Life History: Parthenogenic. Eggs hatch under female covers. Females die after laying eggs.

Damage: Honeydew, sooty mold.

Monitoring: Look for insects and damage.



L.M. Vasvary



John A. Weidhass
Virginia Tech
www.insectimages.org

Hemispherical Scale

Cultural Control: Remove infested plants.

Chemical Control: Oils, biorationals, and systemic insecticides such as imidacloprid. Chemical control is difficult because scale coverings protect the insects.

Biological Control: *Rhyzobius lophanthae* and *Metaphycus helvolus*.



Top and side views of hemispherical scale



Armored scales (Diaspididae)

Armored scales

black pineleaf scale

euonymus scale

gloomy scale

juniper scale

obscure scale

oystershell scale

pine needle scale

scurfy scale

Boisduval Scale

Diaspis boisduvali
Order Hemiptera
Family Diaspididae

Description: Adult females are 1.2 to 2.25 mm in diameter, circular or oval, flat, white to light yellow, and semitransparent. Males are somewhat rectangular, elongate, about 1 mm in length, and white with three ridges down the back.

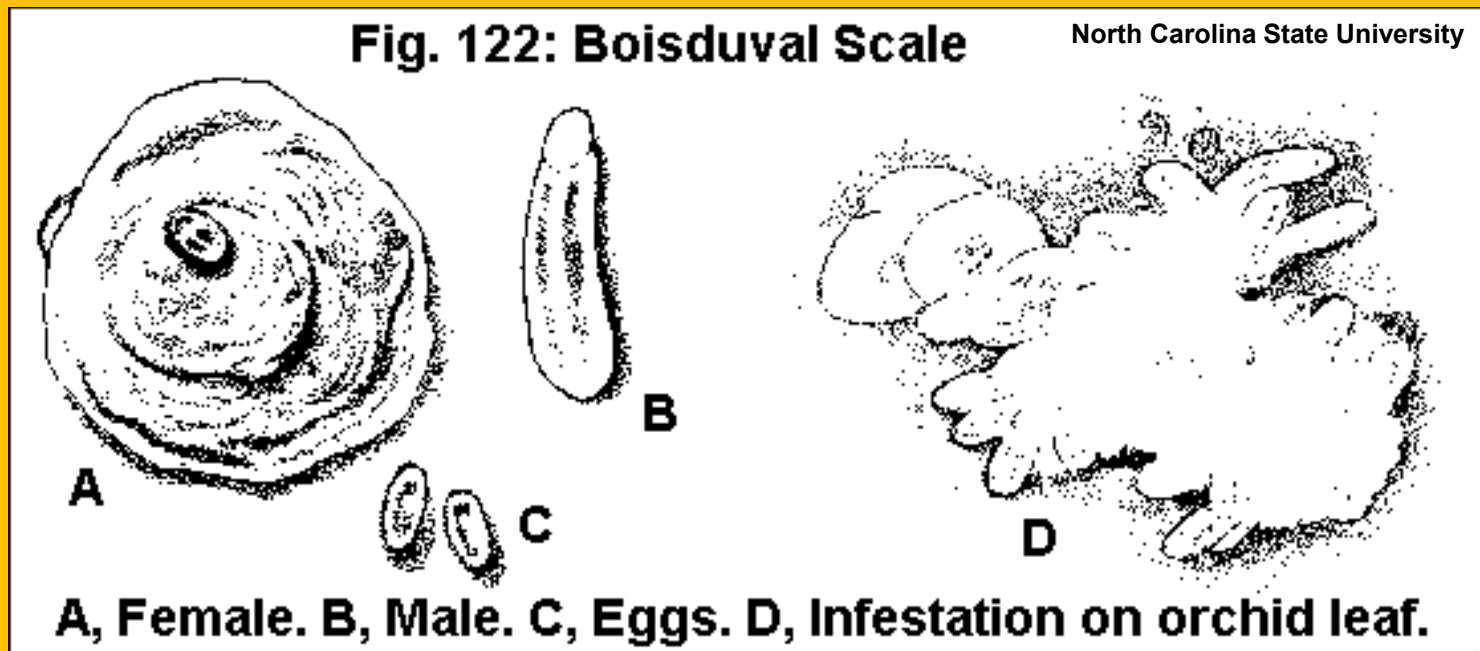


Boisduval Scale

Hosts: Orchids, palms, banana, and cactus.

Life History: In the greenhouse this scale can complete its life cycle in about 50 days.

Females may produce up to 200 eggs in a lifetime. Generations overlap.



Boisduval Scale

Damage: Chlorotic spots and death of leaves.

Monitoring: Look for adults, crawlers, damage.

Cultural Control: Try to purchase plants from a supplier who does not have a scale infestation.

Chemical Control: Oils and other insecticides. Chemical control is difficult because waxy scale coverings protect the insects.



North Carolina State University

Fern Scale

Pinnaspis aspidistrae

Order Hemiptera

Family Diaspididae

Description: Adult females are pear or oystershell shaped, flat, light brown, and 1.5 to 2.5 mm long. Immature males are white felted and three-ridged. Adult males are tiny and winged. Crawlers are yellow.



University of Florida

Hosts: Fern, lirioppe, citrus, and others.

Fern Scale

Life History: Females lay eggs under armor, then die. First instar crawlers are active. Males emerge from second instar armor and crawl or fly to female scales to mate.

Damage: Yellow spots and reduced vigor.

Monitoring: Look for adults, crawlers, damage.



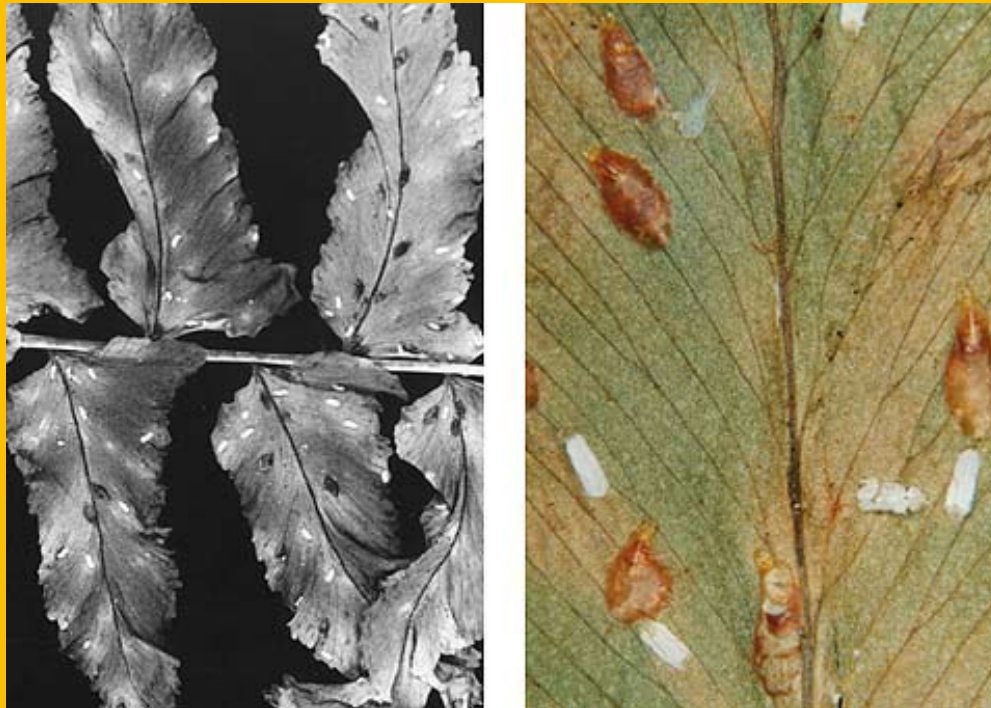
Lance S. Osborne
University of Florida

**Brown female and
white male covers**

Fern Scale

Cultural Control: Purchase from a supplier who doesn't have scales.

Chemical Control: Use carefully; ferns are sensitive to chemicals.



Citrus Mealybug

Planococcus citri

Order Hemiptera

Family Pseudococcidae

Hosts: Females grow to 3 mm long. White, waxy filaments protrude from the periphery. Males are small and winged. Crawlers are yellow.

Adult female, nymph, and crawlers



Citrus Mealybug

Hosts: Plants in 27 families, including begonia, coleus, amaryllis, cyclamen, and dahlia.

Life History: Females produce cottony ovisacs from which crawlers appear. Males are rarely seen.

Adult male



Lance S. Osborne
University of Florida

Citrus Mealybug

Damage: Distorted growth, leaf drop, honeydew, sooty mold, cottony wax.

Monitoring: Look for cottony wax, adult females, and crawlers.

Cultural Control:
Remove infested plants.

Mealybugs on coleus.
Note the white wax,
yellow crawlers and
pale pink females.



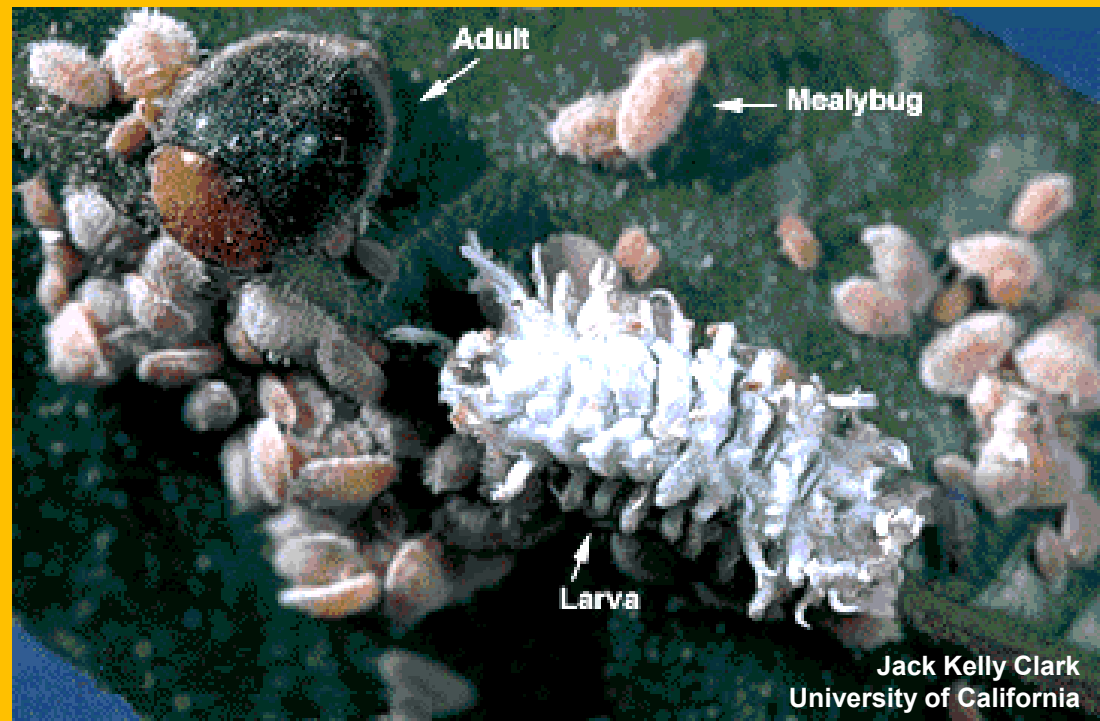
Citrus Mealybug

Chemical Control: Oils, biorationals, and systemic insecticides such as imidacloprid.

Biological Control: The lady beetle *Cryptolaemus montrouzieri* and parasitic wasps

Leptomastix dactylopii and *Anagyrus pseudococci*.

Cryptolaemus montrouzieri. The larva mimics a mealybug.



Longtailed Mealybug

Pseudococcus longispinus

Order Hemiptera

Family Pseudococcidae

Description: Adult females have 17 pairs of filaments and are 6 to 7 mm long including filaments. Males have wings.

Adult females (top and bottom)

Jack Kelly Clark
University of California



Lance S. Osborne
University of Florida



Longtailed Mealybug

Hosts: Many plants.
Dracaena is a favorite.

Life History: Females
give birth to live young
on fluffy wax.

Damage: Distorted
growth, honeydew,
sooty mold, fluffy wax.

Monitoring: Look for
cottony wax, adult
females, and crawlers.



Longtailed Mealybug

Cultural Control: Remove infested plants.

Chemical Control: Oils, biorationals, and systemic insecticides such as imidacloprid. Chemical control is difficult.

Biological Control: *Cryptolaemus montrouzieri*, lacewing larvae, and the parasitic wasp *Anagyrus nigricornis*.

Adult male



Root Mealybugs

***Rhizoecus* spp.**
Order Hemiptera
Family Pseudococcidae

Description: White
and 1.6 to 3.9 mm long
(depending on species).
Some have waxy
filaments that form a netting.

Hosts: Many plants, including chrysanthemum,
anemone, gladiolus, iris, African violet,
Achillea, *Arctostaphylos*, *Geum*, and *Polygala*.



Jack Kelly Clark
University of California

Nymphs

Root Mealybugs

Life History: Eggs are laid in a loose ovisac. All stages can be found on roots and potting mix of African violets.

Damage: Devitalization, foliage deterioration, death.

Monitoring: Examine plant root balls. The presence of ants can indicate mealybugs.

Cultural Control: Remove infested plants, control ants.

Chemical Control: Systemic insecticides, such as imidacloprid, are the most effective.

Landscape scales

Magnolia Scale Females
with Crawlers



Soft scales

(Coccidae, Eriococcidae)

SOFT SCALES

calico scale

cottony maple scale

European fruit lecanium scale

Fletcher scale

pine tortoise scale

spruce bud scale

tuliptree scale

Magnolia scale

FELT SCALES

European elm scale (Eriococcidae)

European Elm Scale

Gossyparia spuria

Family Eriococcidae

Introduced pest

Hosts: Elm, *Celtis* species, and zelkova.



European Elm Scale

Life History: Eggs in May, crawlers in June and July. One generation a year.

Overwintering: Immatures in bark cracks.



winter immatures

European Elm Scale

Damage: Stunted, chlorotic foliage, premature leaf drop, branch dieback, sooty mold.

Monitoring: Look for honeydew, mature females, crawlers, and damage.



summer
crawlers

European Elm Scale

Chemical Control: Insecticides, oil.

Biological Control: Beneficials usually occur.



**summer adult female
with crawlers**

Calico Scale

Eulecanium cerasorum

Family Coccidae

Native pest

Hosts: Crabapple, dogwood, elm, firethorn, maple, sweet gum, star magnolia, zelkova, and all stone fruit trees.



Life History: One generation per year. Crawlers feed on leaf veins during summer.

Calico Scale

Overwintering: Second instar.

Monitoring: Look for adults and crawlers, honeydew, and sooty mold.

Chemical Control: Dormant oil, horticultural oil or soap residual insecticides.

Biological Control: Minute pirate bugs, lacewings, lady beetles, predaceous midges; parasitoids *Aphytis*, *Coccophagus*, *Encarsia*, and *Metaphycus*; yellow-rumped warbler.

Cottony Maple Scale

Pulvinaria innumerabilis

Family Coccidae

Native pest

Hosts: Maples, honeylocust, linden, other hardwoods.



Cottony Maple Scale

Life History: Immature females emerge in spring. Eggs and crawlers appear in summer.

Overwintering: Mated females on twigs.



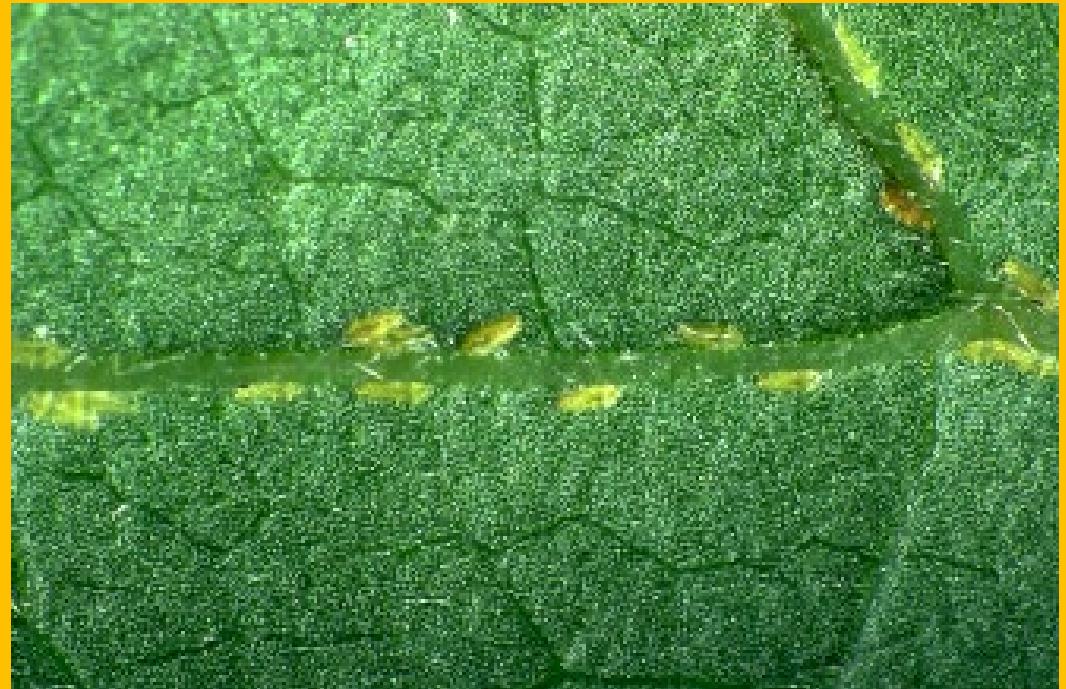
winter adult
females

Cottony Maple Scale

Damage: Sooty mold, leaf yellowing, foliage drop, dieback.

Monitoring: Look for old egg sacs and crawlers on the underside of leaf margins.

Chemical control:
Insecticides,
horticultural oil
or soap.



summer crawlers

Cottony Maple Scale

Biological Control: Minute pirate bugs, lacewings, lady beetles, predaceous midges; parasitoids *Aphytis*, *Coccophagus*, *Metaphycus*, and *Encarsia*; English sparrow.



summer females
with eggs

European Fruit Lecanium

*Parthenolecanium
corni*

Family Coccidae
Native pest

Hosts: Flowering
fruit trees, maples,
others.



spring adult females

Life History: Females mature in spring and lay
eggs. Crawlers feed in summer. One
generation per year

European Fruit Lecanium

Overwintering: Immatures.

Damage: Honeydew, sooty mold, dieback.

Monitoring: Look for adult females, crawlers, honeydew, and sooty mold.

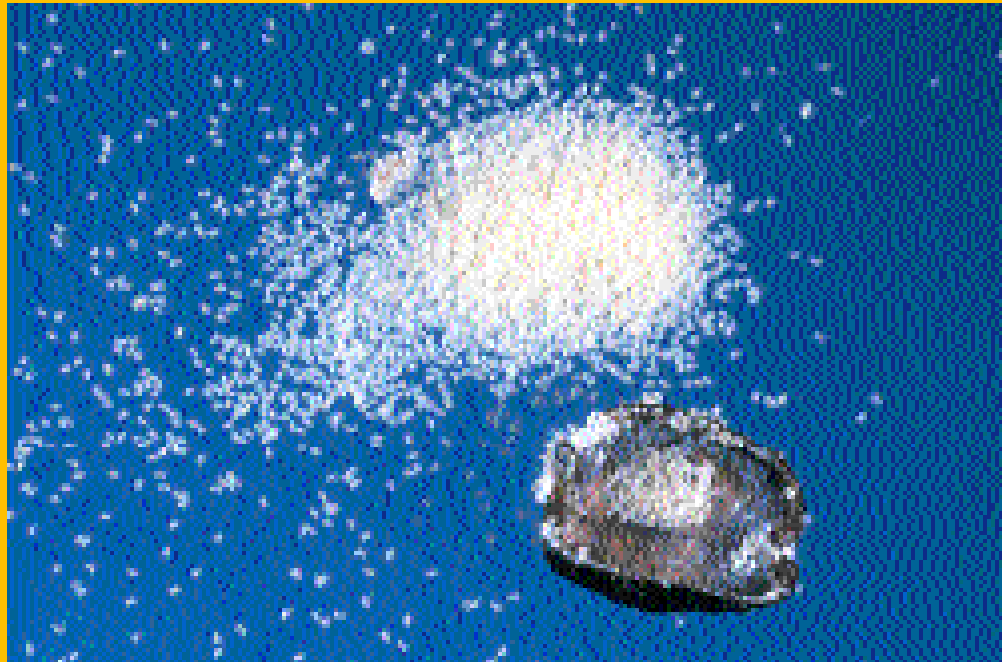
Chemical Control:
Soil application
of insecticides,
oil sprays.



winter immatures

European Fruit Lecanium

Biological Control: Minute pirate bugs, lacewings, lady beetles, predaceous midges; parasitoids *Aphytis*, *Coccophagus*, *Encarsia*, and *Metaphycus*.



summer eggs under cover

Fletcher Scale

Parthenolecanium fletcheri

Family Coccidae

Native pest

Hosts: Yew, arborvitae, juniper.

Life History: Immatures in spring, eggs in May and June. Crawlers feed on needles. One generation per year.

spring adult
females



Fletcher Scale

Overwintering: Immatures on shoots and undersides of leaves.

Damage: Honeydew, sooty mold, yellow needles, needle drop.

Monitoring: Look for honeydew, sooty mold, and the insects.



winter nymphs

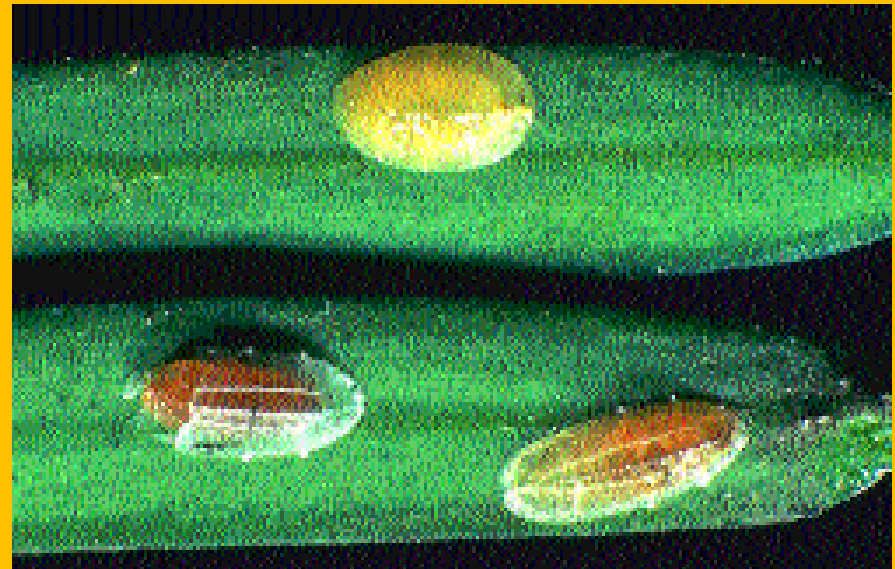
Fletcher Scale

Chemical Control:

Soil application of insecticides, horticultural oil.

Biological Control:

Minute pirate bugs, lacewings, lady beetles, predaceous midges; parasitoids *Aphytis*, *Coccophagus*, *Encarsia*, and *Metaphycus*.



above: male and female covers
below: adult females



Pine Tortoise Scale

Toumeyella parvicornis

Family Coccidae

Native pest

Hosts: Pines.

Life History: One generation per year on twigs.

Overwintering: Immatures on twigs.

Damage: Sooty mold, yellowing of branch tips, dieback.

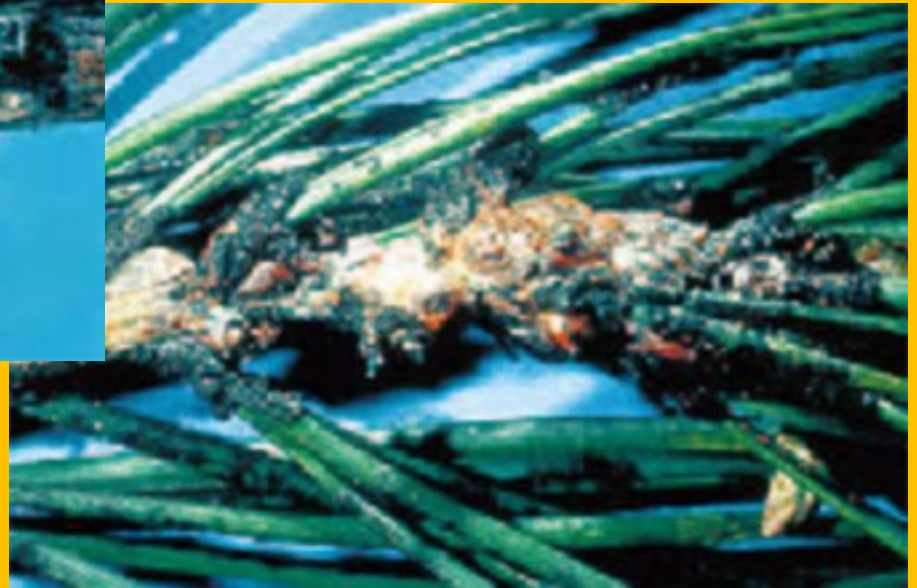


Pine Tortoise Scale

Monitoring: Look for scale covers and reddish crawlers. Look for ants seeking honeydew, sooty mold, and needle yellowing.



spring adult females



Pine Tortoise Scale

Physical Control: Remove and destroy infested branches.

Chemical Control: Dormant oil sprays.



spring adult females

Tuliptree Scale

Toumeyella liriodendri

Family Coccidae

Native pest

Hosts:

Tuliptree, magnolia,
basswood, hickory,
buttonbush, linden,
redbay, and walnut.

summer female
and crawlers



Tuliptree Scale

Life History: Females mature in spring, males emerge in June, live crawlers are produced. One generation per year.

Overwintering: Second instars on twigs.



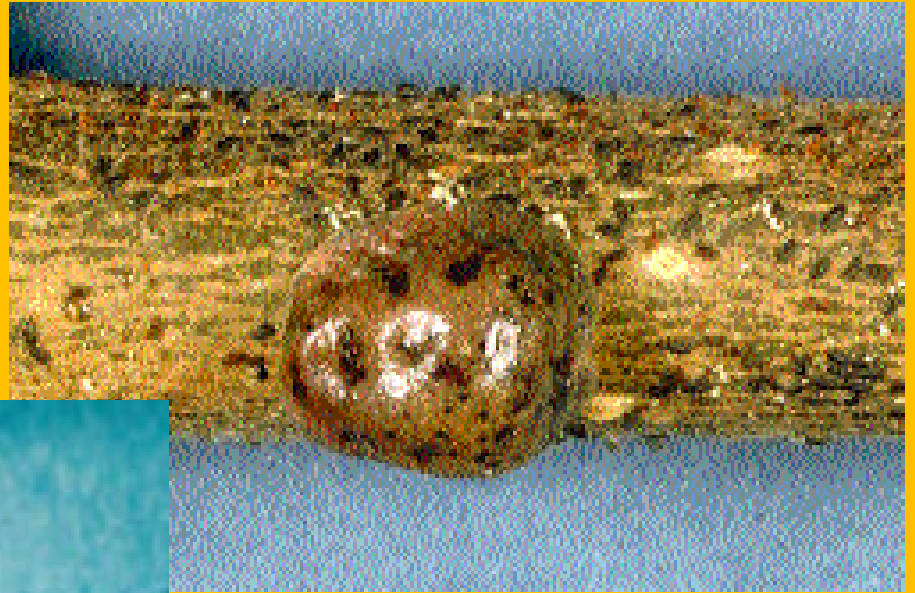
male covers



summer male

Tuliptree Scale

Damage: Honey dew, sooty mold, leaf yellowing, leaf drop, and dieback.



above: summer dead female and settled crawlers

left: summer nymphs



Tuliptree Scale

Monitoring: Look for black immatures overwintering on twigs. Look females and ants tending aphids.



winter immatures

Tuliptree Scale

Chemical Control: Dormant oil sprays, oil or soap in late June.



summer females

Spruce Bud Scale

Physokermes picea

Family Coccidae

Native pest

Hosts: Spruce.

Life History: Females complete mature in April. Crawlers appear in June and July. One generation per year.

Overwintering: Immatures on the underside of needles.



Spruce Bud Scale

Damage: Honey dew, sooty mold.

Monitoring: Look for adult females, honeydew, sooty mold, and dieback.

Chemical Control: Dormant oil sprays, oil or soap in late June.



summer females

Armored scales (Diaspididae)

ARMORED SCALES

black pineleaf scale

euonymus scale

gloomy scale

juniper scale

obscure scale

oystershell scale

pine needle scale

scurfy scale

Black Pineleaf Scale

Nuculaspis californica

Family Diaspididae

Native pest

Hosts: Douglas fir, jack and mugo pines, other pines.

Life History: One generation per year on needles.

Overwintering: Immature stages.



summer adult females

Black Pineleaf Scale



Damage: Yellow needles, loss of needles, short needles.

Monitoring: Look for adults and crawlers, yellow and short needles.

Chemical Control: Dormant oil, insecticides.

Biological Control: Parasitic wasps, *Prospaltella* sp. and *Phyiscus varicornis*.

summer adult females

Scurfy Scale & Elm Scurfy Scale

Chionaspis furfura &
C. americana

Family Diaspididae
Native pests

Hosts: Elm, apple,
crabapple, mountain
ash, aspen, willow,
dogwood.

**top and bottom:
summer females**



Scurfy Scale & Elm Scurfy Scale

Life History: Crawlers appear in June mature in August, mate and lay eggs. One generation, possibly two, per year.

Overwintering: Eggs under dead mother scale.

Damage: Twig and branch dieback.



crawlers

Scurfy Scale & Elm Scurfy Scale

Monitoring: Look for scale covers and crawlers.

Cultural Control: Most populations can be controlled by reducing tree stress. Avoid killing natural enemies with insecticides.

Chemical Control:
Horticultural oil or soap during crawler emergence.

male and female
covers



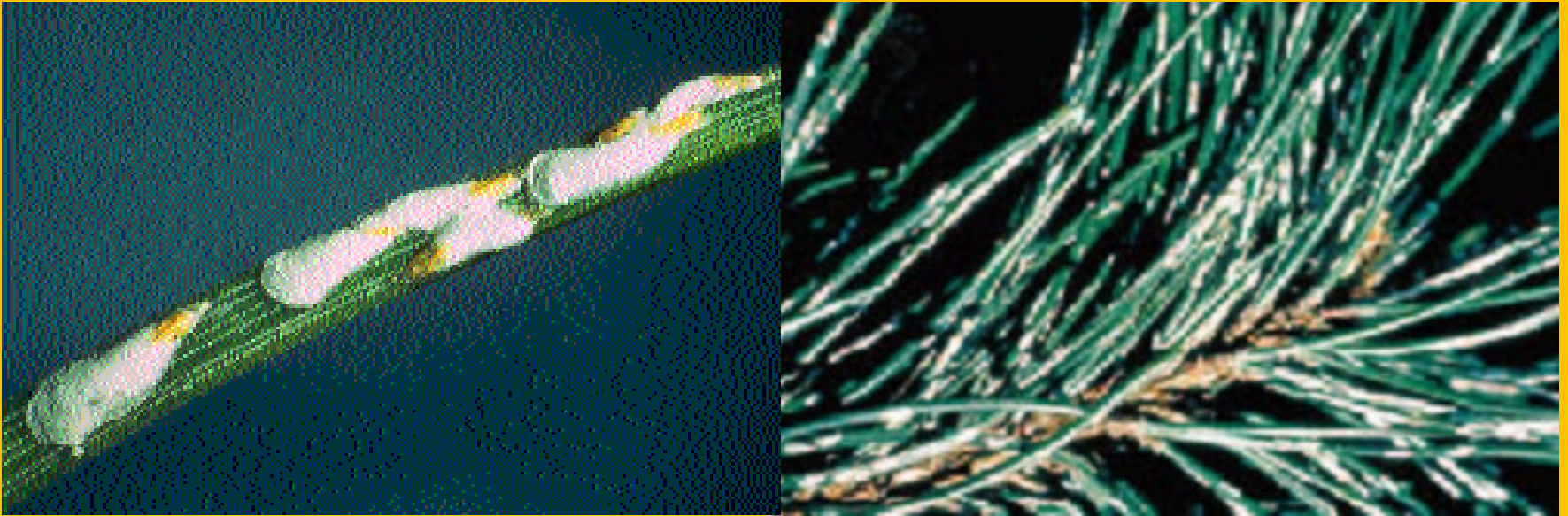
Pine Needle Scale

Chionaspis pinifoliae

Family Diaspididae

Native pest

Hosts: Douglas fir, fir, hemlock, pine, spruce.

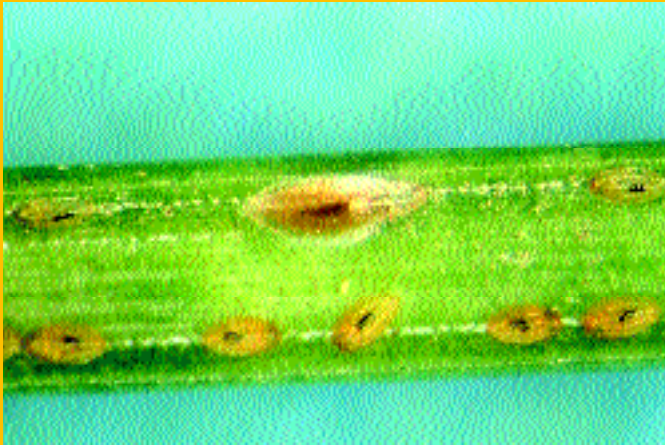


summer adult females

Pine Needle Scale

Life History: Crawlers hatch and mature during the summer and eggs are laid in the fall. One generation per year.

Overwintering: Eggs under scale covers.



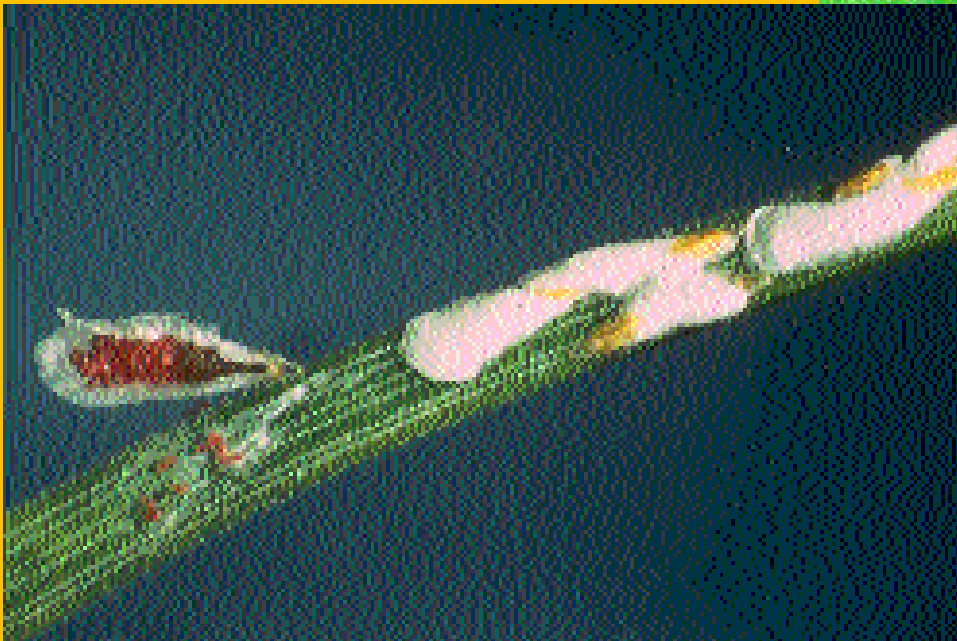
nymphs



Pine Needle Scale

Damage: Brown needles, loss of needles.

Monitoring: Look for scale covers and crawlers.



adult females

Pine Needle Scale

Physical Control: Remove and destroy heavily infested branches.

Chemical Control: Dormant oil sprays.



parasitoid



parasitoid
and predator

Gloomy Scale

Melanaspis tenebricosa

Family Diaspididae

Native pest

Hosts: Red and silver maples, boxelder, catalpa, elm, hackberry, mulberry, sycamore.



spring adult female

Gloomy Scale

Life History: Eggs and crawlers in June and July, adults in August. One generation a year.

Overwintering: Mated females.



spring adult
female

Gloomy Scale

Damage: Stunting and dieback.

Monitoring: Look for scale covers and crawlers.

Chemical Control: Dormant oil.

Biological Control: Minute pirate bugs, lacewings, lady beetles, predaceous midges; parasitoids *Aphytis*, *Coccophagus*, *Encarsia*, and *Metaphycus*.

Obscure Scale

Melanaspis obscura

Family Diaspididae

Native pest

Hosts: Oaks.

Life History: Adults in May, eggs in June, crawlers in July. One generation a year.

Overwintering: Immature stages.

Damage: Dieback on small branches.

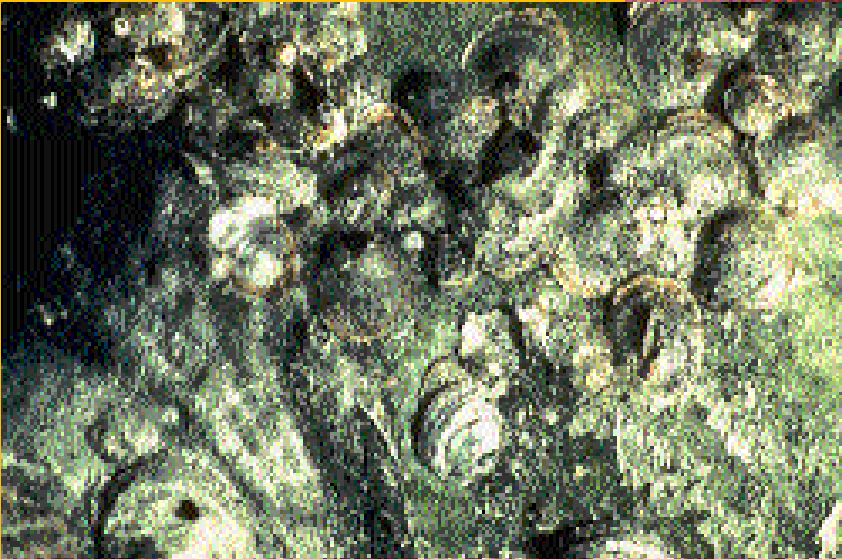
Monitoring: Look for scale covers and crawlers.



Obscure Scale

Cultural Control: Avoid over-fertilizing.

Chemical Control: Dormant sprays, summer oil sprays.



summer adults

Juniper Scale

Carulaspis juniperi

Family Diaspididae

Introduced pest

Hosts: Juniper, cryptomeria, northern white cedar, cypress.

Life History:

Crawlers appear in late June. One generation per year.



spring adult males and females

Juniper Scale

Overwintering: Adult females on needles.

Damage: Failure of new growth to develop, yellowing, dieback.

Monitoring: Look for yellowing and scale covers.

Chemical Control: Dormant oil. Do not make further insecticide applications if natural enemies are present.

Biological Control: Lady beetles *Hippodamia*, *Cryptolaemus*, and *Rhizobius*.

Euonymus Scale

Unaspis euonymi
Family Diaspididae
Introduced pest

Hosts: Euonymus,
bittersweet, and
pachysandra.

Life History: Two
generations per year.
Females on bark, males
on leaves.

Overwintering: Mated females.



Euonymus Scale

Damage: Yellow spots on leaves, loss of leaves, dieback.

Monitoring: Look for white male covers on leaves, brown female covers on bark, and damage.



Euonymus Scale

Cultural Control: Plant resistant species of Euonymus, such as *E. alatus* and *E. kiautschovicus*.

Chemical Control:
Dormant oil.

Biological Control:
The lady beetle
Chilocorus kuwanae.



Oystershell Scale

Lepidosaphes ulmi

Family Diaspididae

Native pest

Hosts: Ash, beech, birch, boxwood, cotoneaster, elm, fruit trees, lilac, maple, poplar, willow.



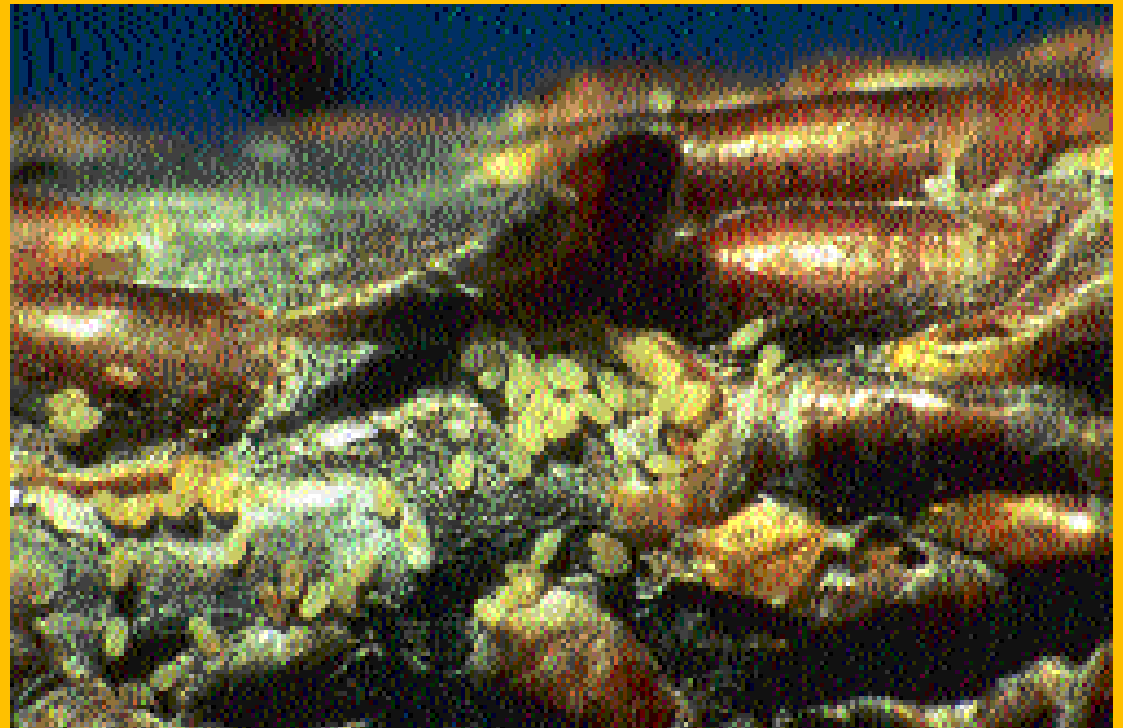
brown adults

Oystershell Scale

Life History: Nymphs mature in mid-summer to mate. Eggs in late summer and early fall. One generation a year.

Overwintering: Eggs under the cover of the dead mother scale.

winter
crawlers



Oystershell Scale

Damage: Cracked bark and chlorotic, stunted foliage, yellowing, wilting, dieback.

Monitoring: Look for crawlers, scale covers, and damage.

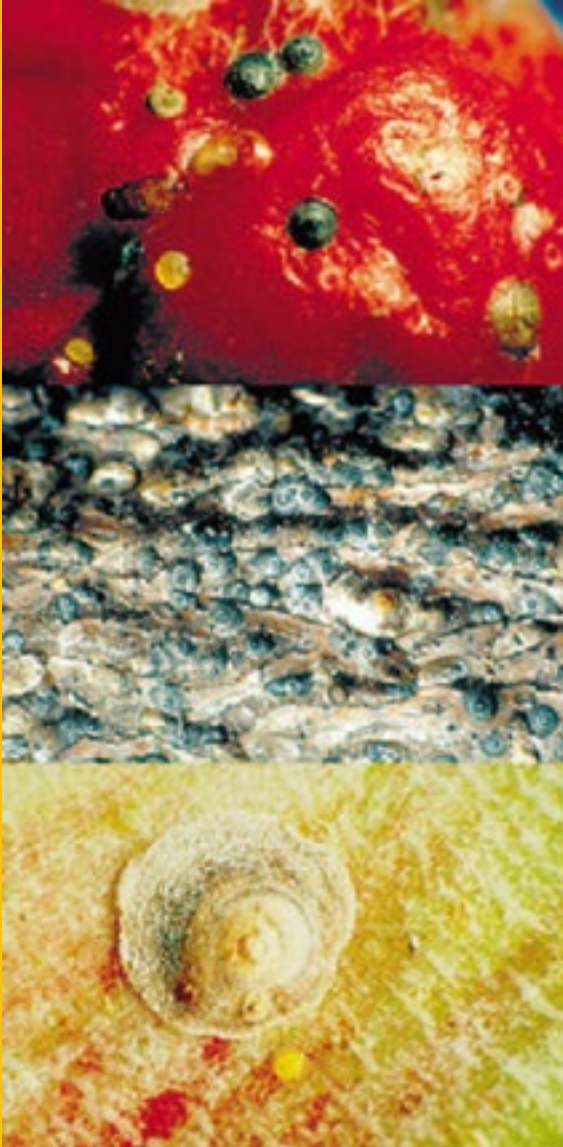
Cultural Control:
Remove and destroy heavily infested branches.

Chemical Control:
Horticultural oils.



summer gray adults

San Jose Scale



Quadraspidiotus perniciosus
Family Diaspididae

Hosts: Rosaceous flowering fruits and plants.

Life History: Generations overlap from mid-May through September. Yellow crawlers are active from late June to early July.

Overwintering: First instars on bark.

San Jose Scale

Damage: Inner bark turns red. Leaf wilting, dieback.

Monitoring: Look for scale covers, yellow crawlers, and damage.

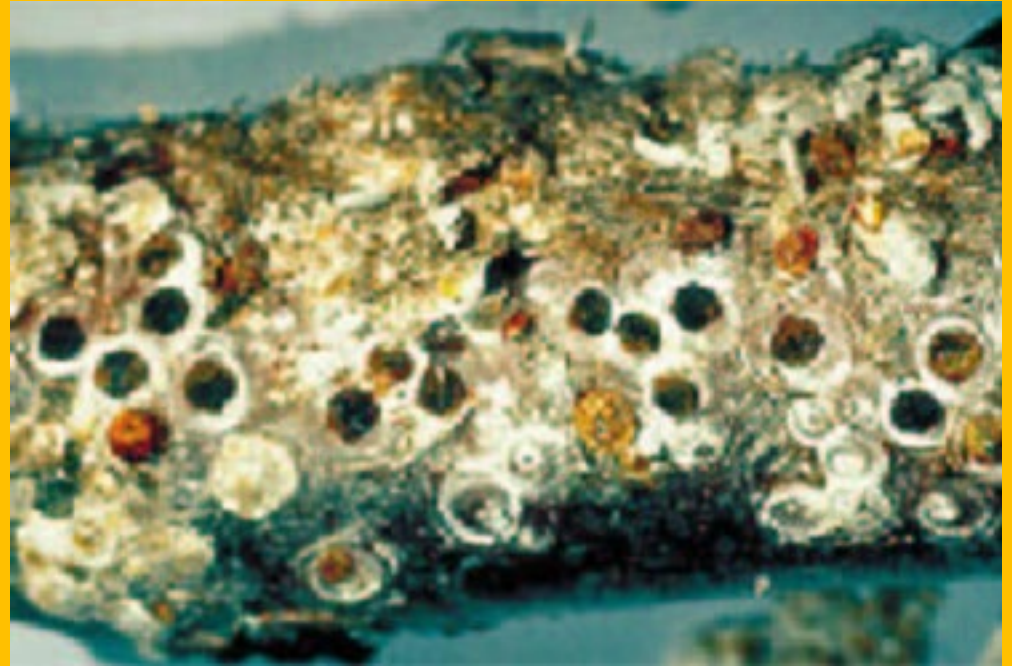
Physical Control: Remove and destroy heavily infested branches and branches showing dieback.

Chemical Control: Dormant and summer oil sprays, insecticides.

White Peach Scale

*Pseudaulacaspis
pentagona*
Family Diaspididae

Hosts: Mulberry,
peach, persimmon,
and redstemmed
dogwoods.



Life History: Several generations a year.

Overwintering: Adult females.

White Peach Scale

Damage: Leaf yellowing, leaf drop, dieback.

Monitoring: Look for damage, white male covers, and pink crawlers.

Physical Control: Prune out heavily infested limbs that are showing dieback. Remove accessible white patches on healthy trees by scrubbing.

Chemical Control: Horticultural oil or soap. Use residual insecticides sparingly.

White Prunicola Scale

*Pseudaulacaspis
prunicola*
Family Diaspididae

Hosts: *Prunus*
spp., lilac, privet.

Life History:

Several generations a year.

Overwintering: Adult females on bark.



White Prunicola Scale

Damage: Leaf yellowing, leaf drop, dieback.

Monitoring: Look for damage, white male covers, and white and pink crawlers.

Physical Control: Prune out heavily infested limbs that are showing dieback. Remove accessible white patches on healthy trees by scrubbing.

Chemical Control: Horticultural oil or soap. Use residual insecticides sparingly.

Pubescent Leaf Kermes & Pin Oak Kermes



Nanokermes pubescens &
Allokermes galliformis
Family Kermesidae
Native pests

Hosts: Oak.

Life History: Females on leaf stems, males on branches. Eggs in June and July. One generation per year.

summer female

Pubescent Leaf Kermes & Pin Oak Kermes

Overwintering: Crawlers in bark.



**summer
females**



Pubescent Leaf Kermes & Pin Oak Kermes

Damage: Leaf distortion, flagging, yellowing, dieback.

Monitoring: Look for the insects.

Chemical Control: Dormant oils, residual insecticides.

Biological control: Parasitic wasps (family Encyrtidae), the lady beetle *Chilocerus stigma*.