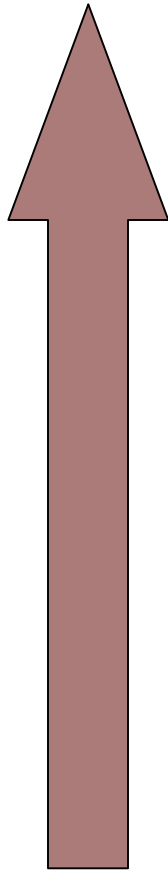


Scale Insects and Their Relatives

- What are scales?
 - Biology, Phylogeny
- Diagnosis of Scales
- Biology and Control of Key Species

Scale Insects and Their Relatives

Mobility



Aphids

Adelgids

Margarodid scales

Ensign scales

Mealybugs

Bark scales

Bark crevice scales

Kermes or gall-like scales

Soft scales

False pit scales

Pit scales

Armored scales



How to tell scales from just another bump on a log?



Galls are bumps of plant tissue that rip when removed.

Galls



Gall makers



Armored Scale Diagnosis



Bumps present, no honeydew, bumps not part of plant

What Are Scales?

Pine Needle Scale

Crawlers



Settlers



Adults



Parasite
Exit hole

Armored Scales Under a Waxy Cover



Armored Scale Diagnosis

Dieback



Waxy Scale Covers

Euonymus scale (armored)



Juniper scale (Armored)



Obscure Scale (Armored)



Oystershell scale (Armored)



Pine needle scale (Armored)



Parasitoid
Exit hole

San Jose Scale (Armored)



Scurfy Scale (Armored)



Winged Euonymus Scale (Armored)



Armored Scale Summary

Winters as egg stage:

- Oystershell, Winged euonymus, and pine needle (in part)

One generation/year (Month)

- San Jose Scale (mid Jun-July)
- Obscure Scale (June or July)

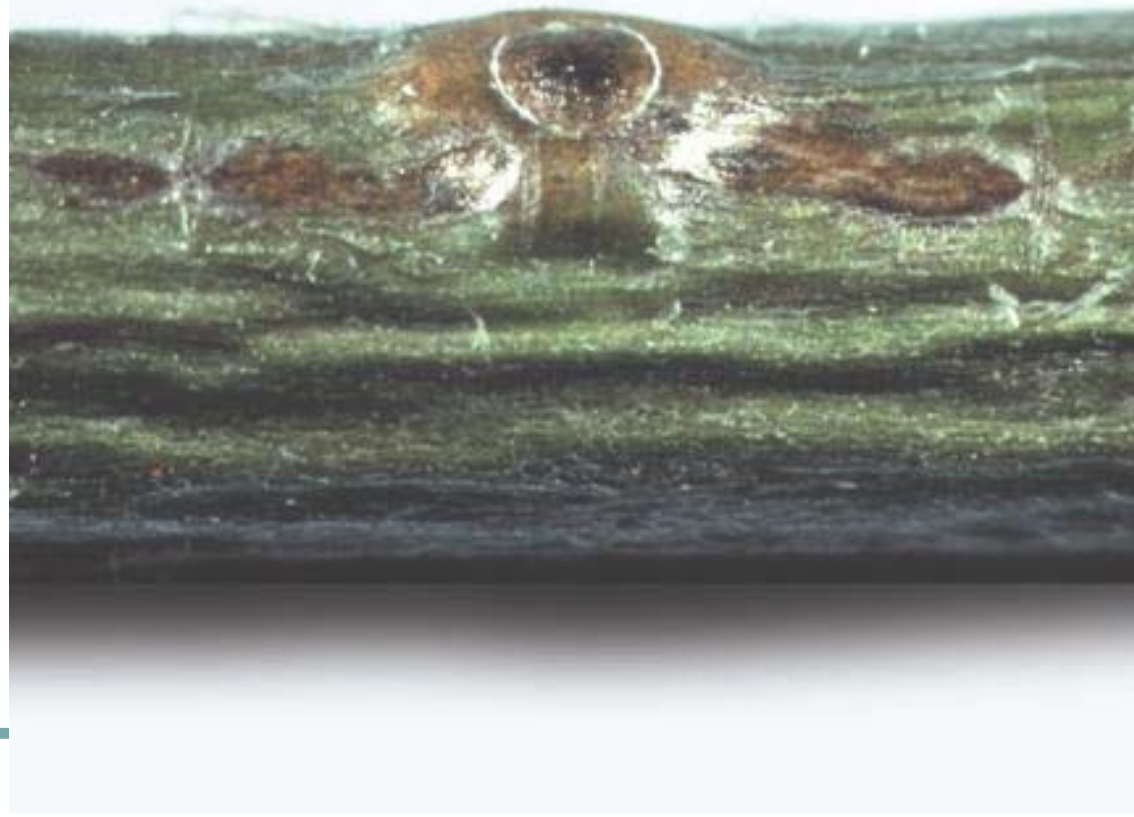
Two generations/year (May, July)

- Euonymus, juniper pine needle, oystershell

Three generations/year

- Winged euonymus (May, July, September)

Golden Oak Scale (Pit scale)



Soft scale diagnosis



Honeydew and Sooty Mold



Bloated Scale Bodies

Cottony Maple Scale (Soft Scale)



Fletcher's Scale (Soft Scale)



Magnolia Scale (soft)



Tuliptree scale (soft)



Spruce Bud Scale



Striped pine scale (soft)



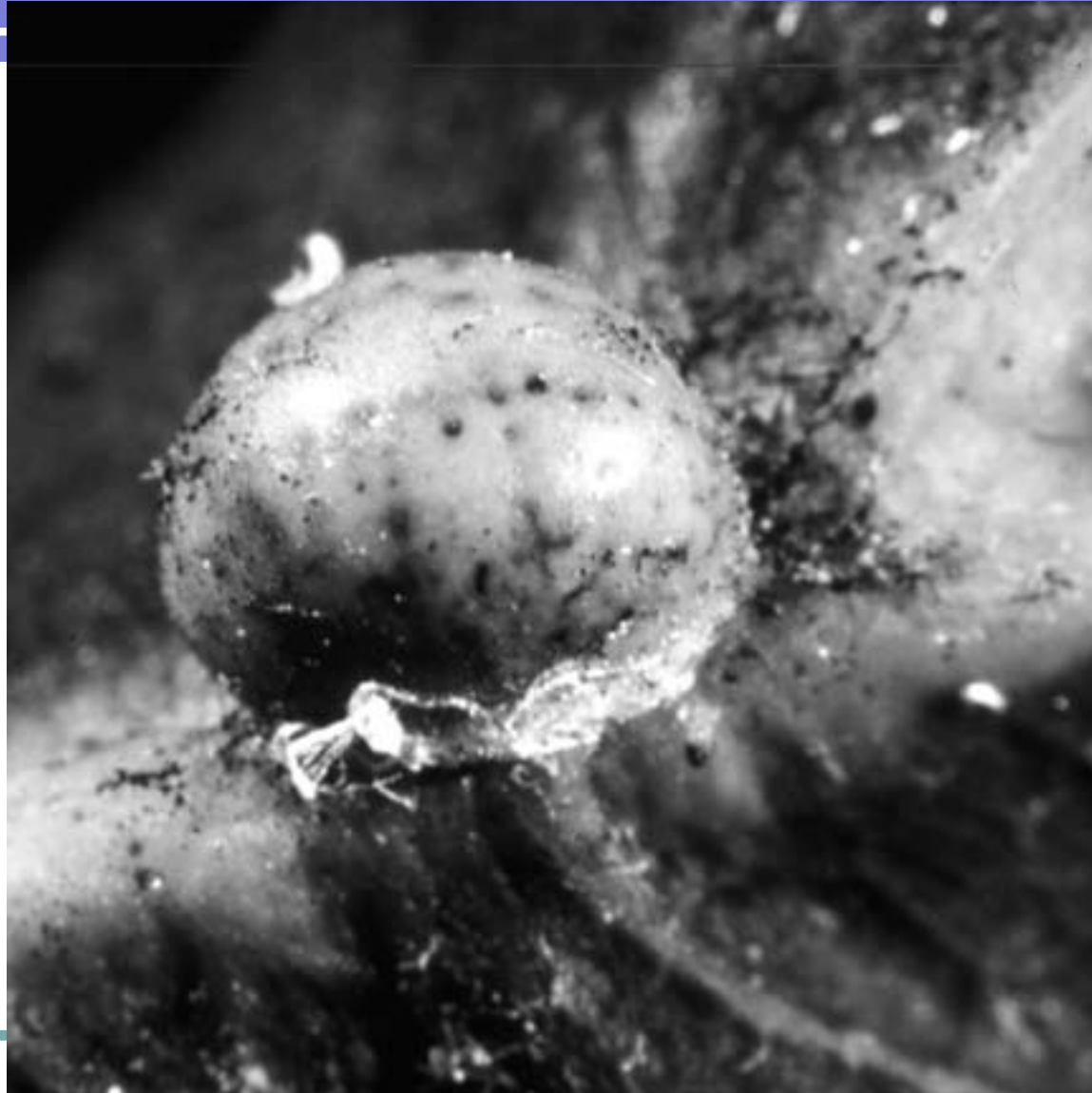
Soft Scale Crawler periods

- April
 - Spruce bud scale
- May-June
 - Cottony maple scale
- June-July
 - Striped pine, Fletcher's
- September
 - Tuliptree, Magnolia

European Elm Scale (Bark Scale)



Kermes scale



Mealybug Diagnosis



- Plant sticky and or coated with black mold
- Bumps not part of plant
- Bugs covered with waxy powder

Taxus mealybug



Hawthorn mealybug



Miscanthus mealybug

- An emerging problem on ornamental grasses
- Winters and gravid female
- Crawlers in spring
- Move on contaminated nursery stock
- Control with imidacloprid

Miscanthus mealybug



<http://www.ppd.l.purdue.edu/ppdl/weeklypics/8-25-03.html>