SAP-FEEDING INSECTS PESTS OF WOODY PLANTS

IDENTIFICATION, BIOLOGY, AND MANAGEMENT

INTRODUCTION

- Pest Identification
- Pest Biology
- Pest Significance
- Pest Management

SAP-FEEDING INSECT PESTS

- Aphids
- Soft scales
- Mites

"Bugs"and Leafhoppers

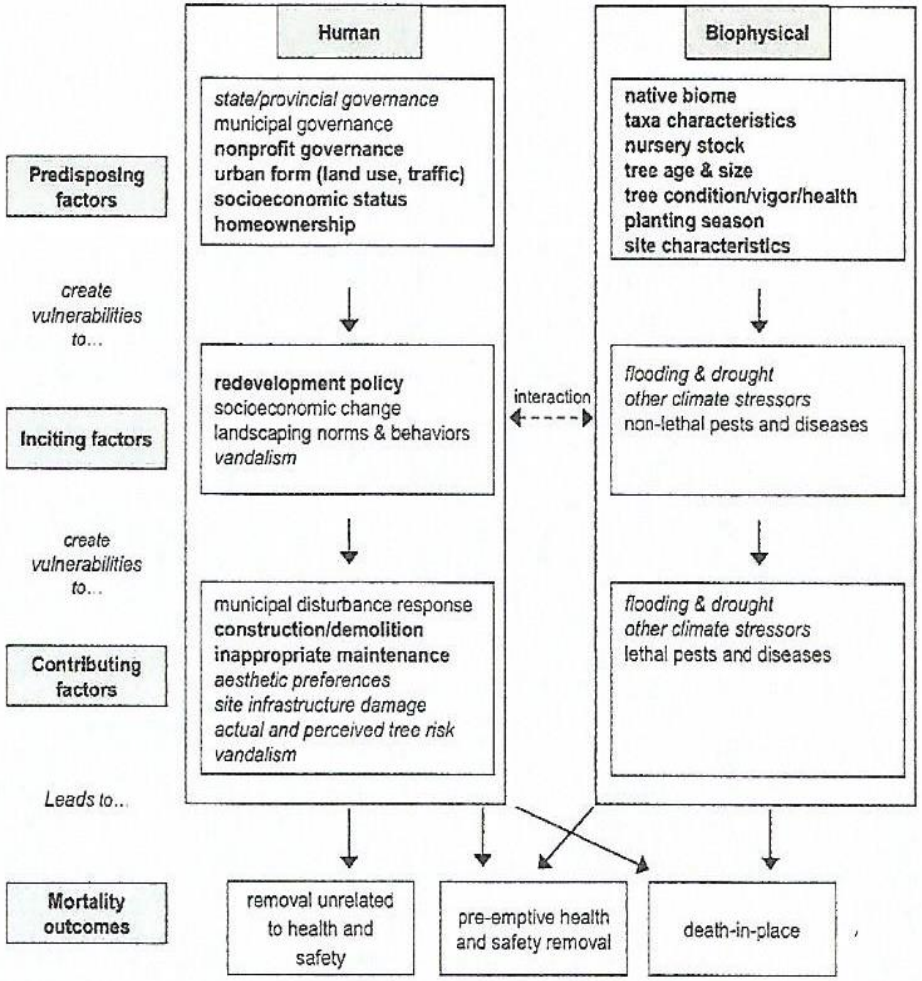
Armored scales

Box 1. The Urban Tree Mortality Framework: Predisposing, Inciting, and Contributing Factors

The urban tree mortality framework identifies predisposing, inciting, and contributing factors.

- **Predisposing factors**: the normal human and site-related conditions that a tree is exposed to in its environment.
- **Inciting factors:** short-term stressors that impact tree vigor.
- **Contributing factors:** the mechanisms that ultimately lead to tree death.

Predisposing and inciting factors work against the tree, setting the stage for the contributing factors to cause mortality (after Manion 1981). In the framework below, factors in each box are ordered from larger scales at the top (e.g., regional, municipal) to smaller scales (e.g., parcel, planting site). Factors found to be statistically significant in the studies reviewed are bolded, while those that were qualitatively important are italicized. (Hilbert et al. 2019)



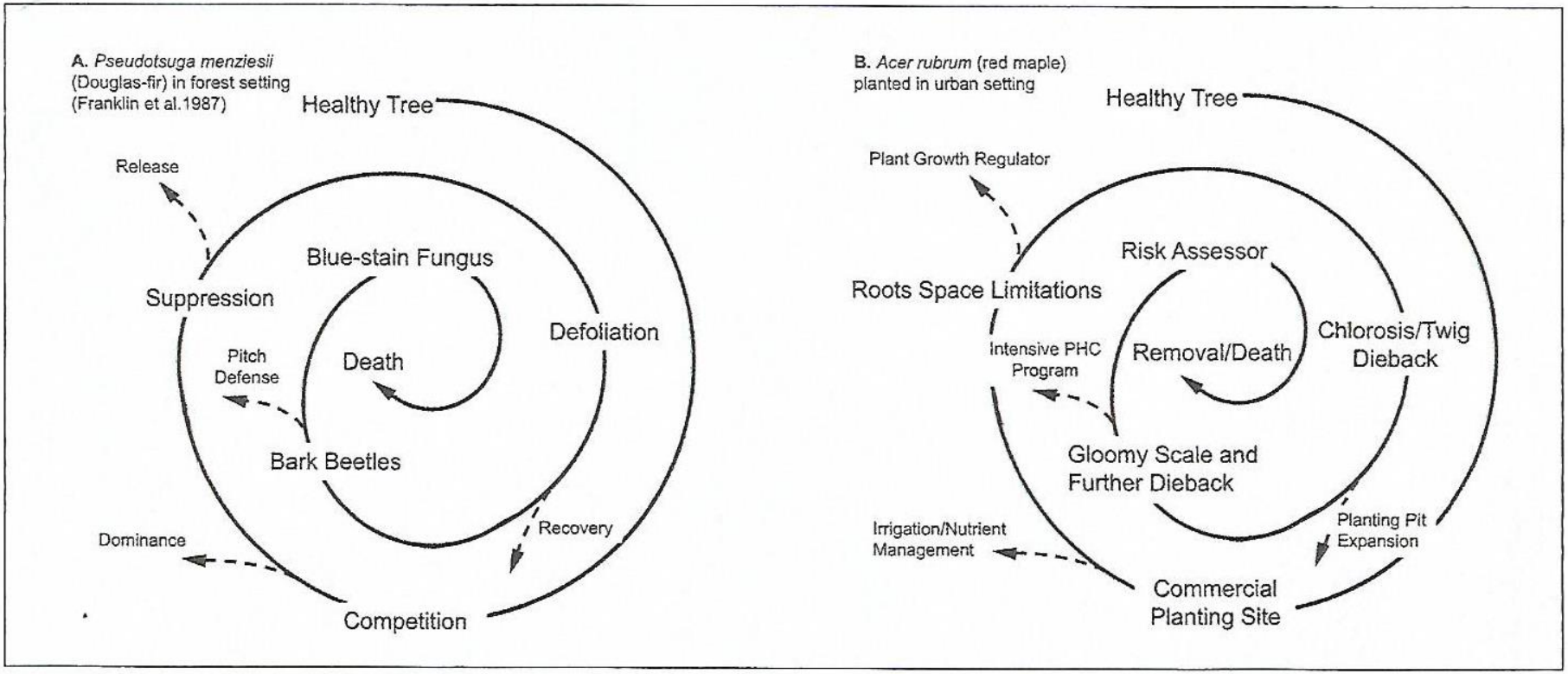


Figure 1. Tree mortality spirals depicting (A) an example tree in a natural forest (adapted from Franklin et al. 1987) and (B) an example planted urban tree (Hilbert et al. 2019).

Aphids

- Pear-shaped
- Winged or wingless
- Possess **cornicles**
- Produce **honeydew**

Aphids

- Wide variety of colors
- Populations can build rapidly
- **Many generations per year**

Mama Aphid Giving Birth

Ash Leaf Curl Aphid Damage

“Bugs”and Leafhoppers

- One or two generations per year

- Cause a **distortion, stunting** and/or **stippling** of foliage

“Bugs”and Leafhoppers

- **Host specific**
- Leafhoppers not as host specific
- Do not produce **honeydew**

Potato Leaf Hopper Damage

Oak and Sycamore Lace Bugs

Ash Plant Bug

Honeylocust Plant Bug and Feeding Damage

Soft Scales

- Produce honeydew
- Have only one generation per year
- Overwinter as immature females

Soft Scales

- **“Crawlers”** are more mobile
- **Feed on plant fluids that move via vascular system**
- **Examples:** cottony maple, lecanium, Fletcher, and magnolia scales

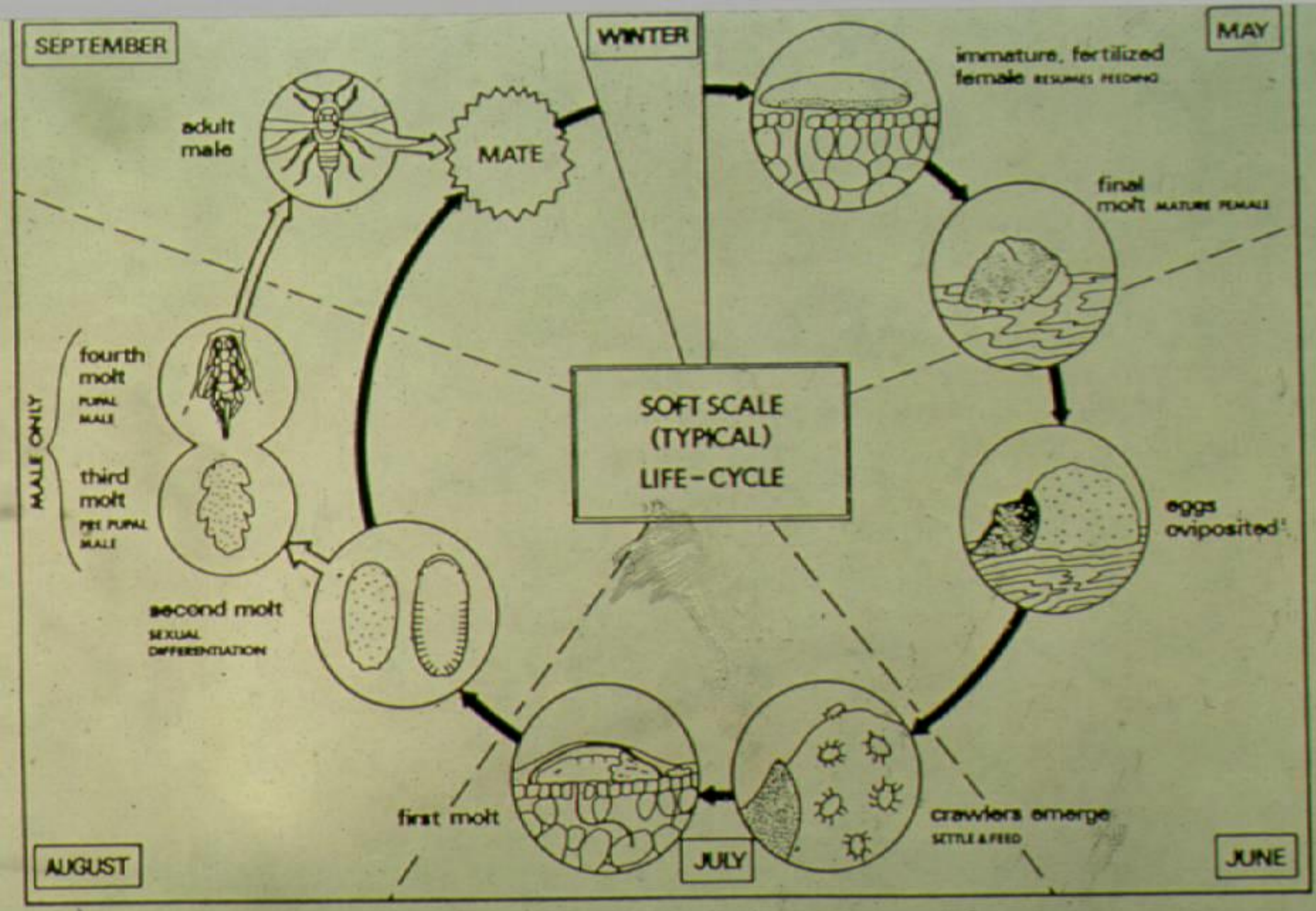


Figure 2. Generalized life cycle for soft scale under climatic conditions of northern United States. Examples of this type of scale include European fruit lecanium scale, cottony maple scale, and terrapin scale.

Cottony Maple Scale

- Common hosts:
  - Silver maple
  - Linden
  - Honeylocust
  - Elm
  - Poplar

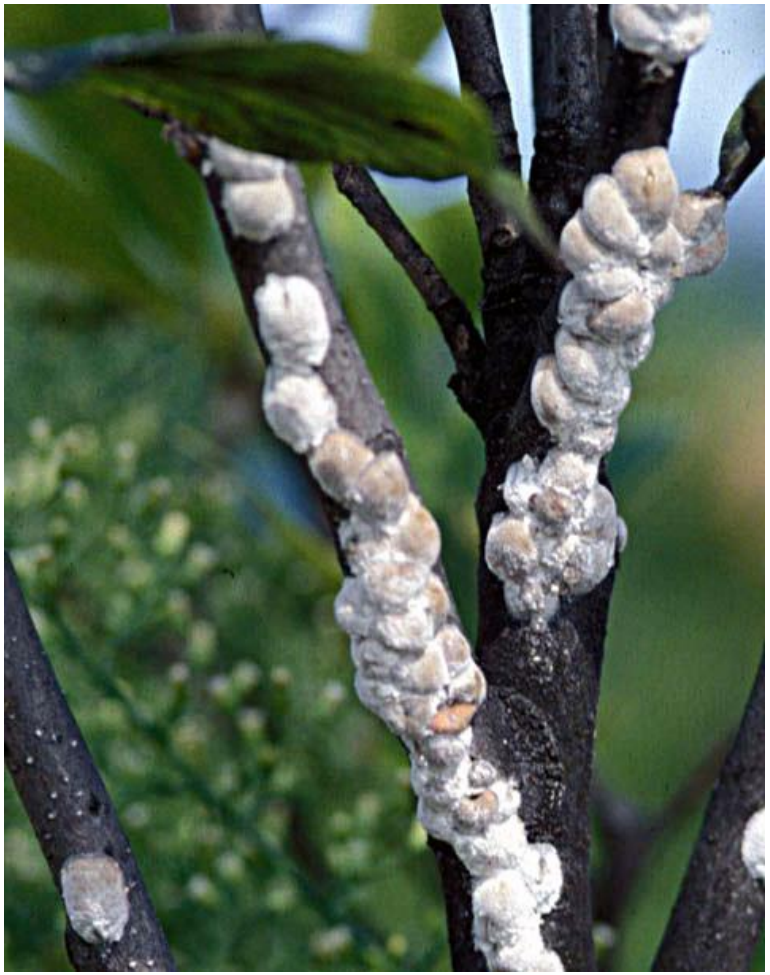
Cottony Maple Scale

Lecanium Scale Complex

- Found on many woody plants
- "**Helmet - shaped**" scale covering

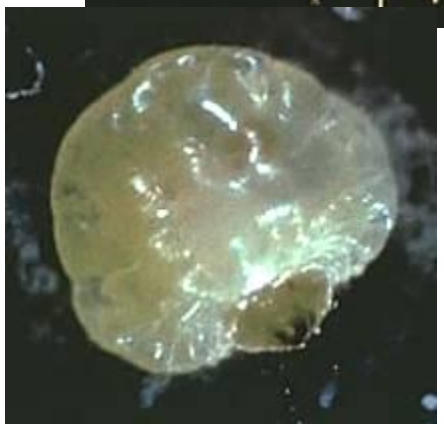
Lecanium Scale on Turkish Hazelnut

Magnolia Scale



Armored Scales

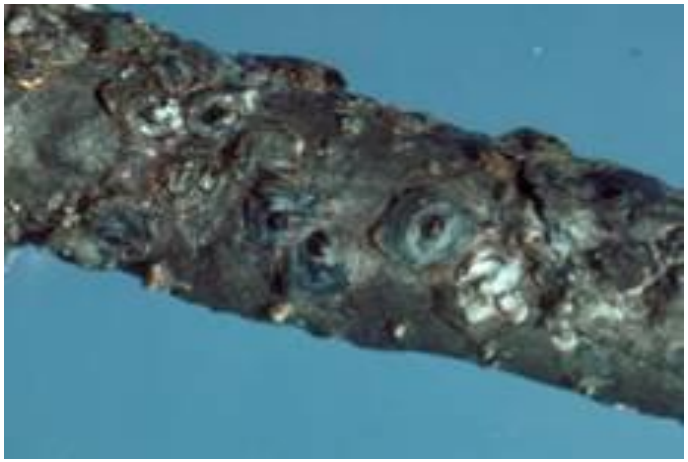
- Two or more generations per year
- Do not produce honeydew
- **Overwinter as an egg**



Armored Scales

- "Crawlers" are less mobile
- **Rupture and destroy plant cells and bypass vascular tissues**
- **Examples:** euonymus, pine needle, obscure, San Jose, and oystershell scales

Armored Scales
(Obscure Scale on Pin Oak)



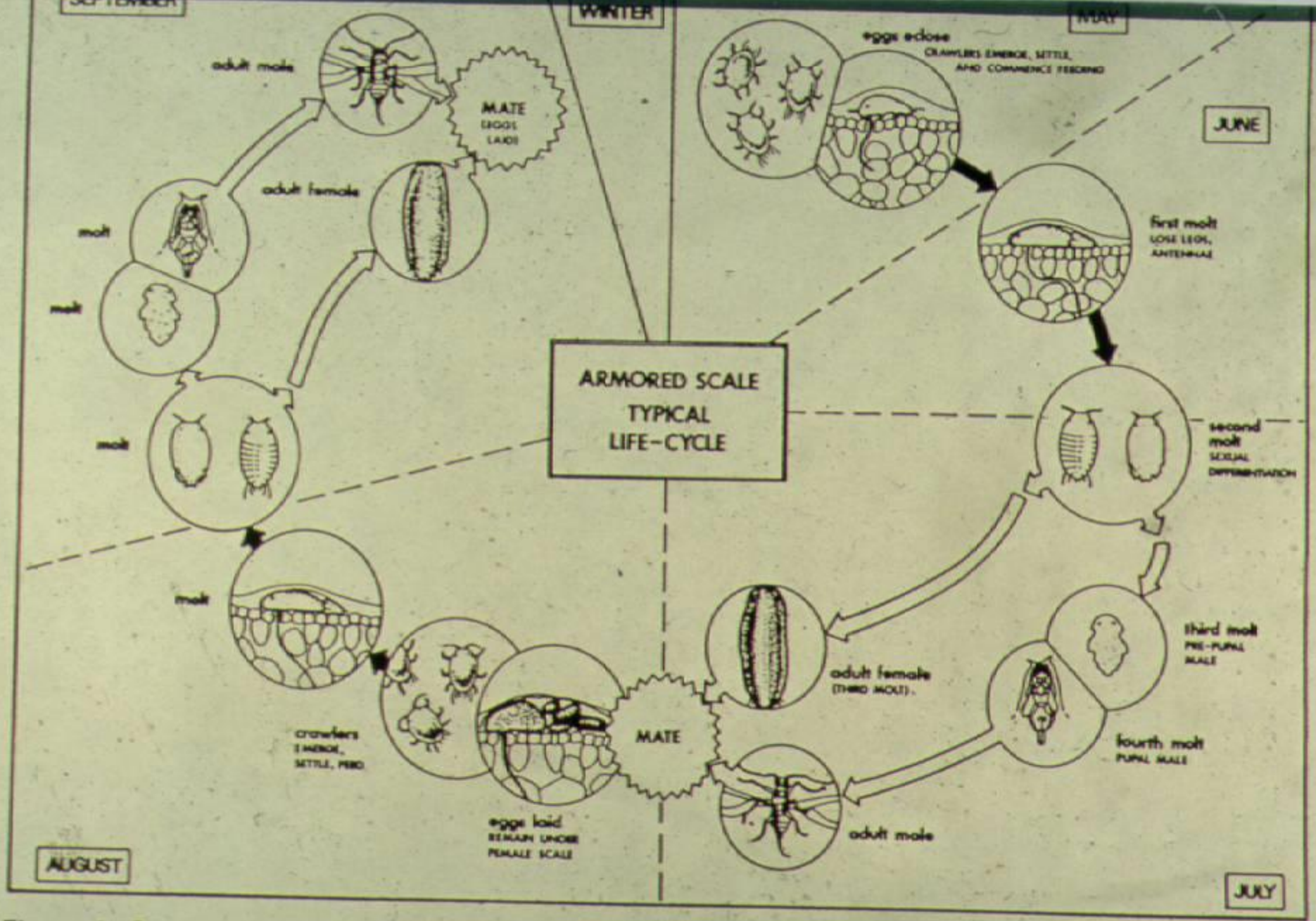
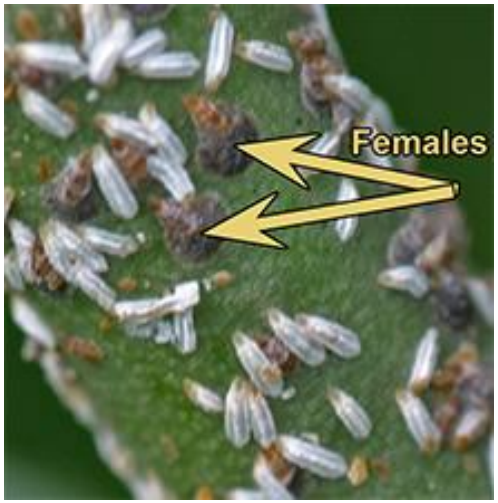


Figure 1. Generalized life cycle for an armored scale in a northern climate. Typical examples are pine needle scale, fiorinia hemlock scale, and oystershell scale.

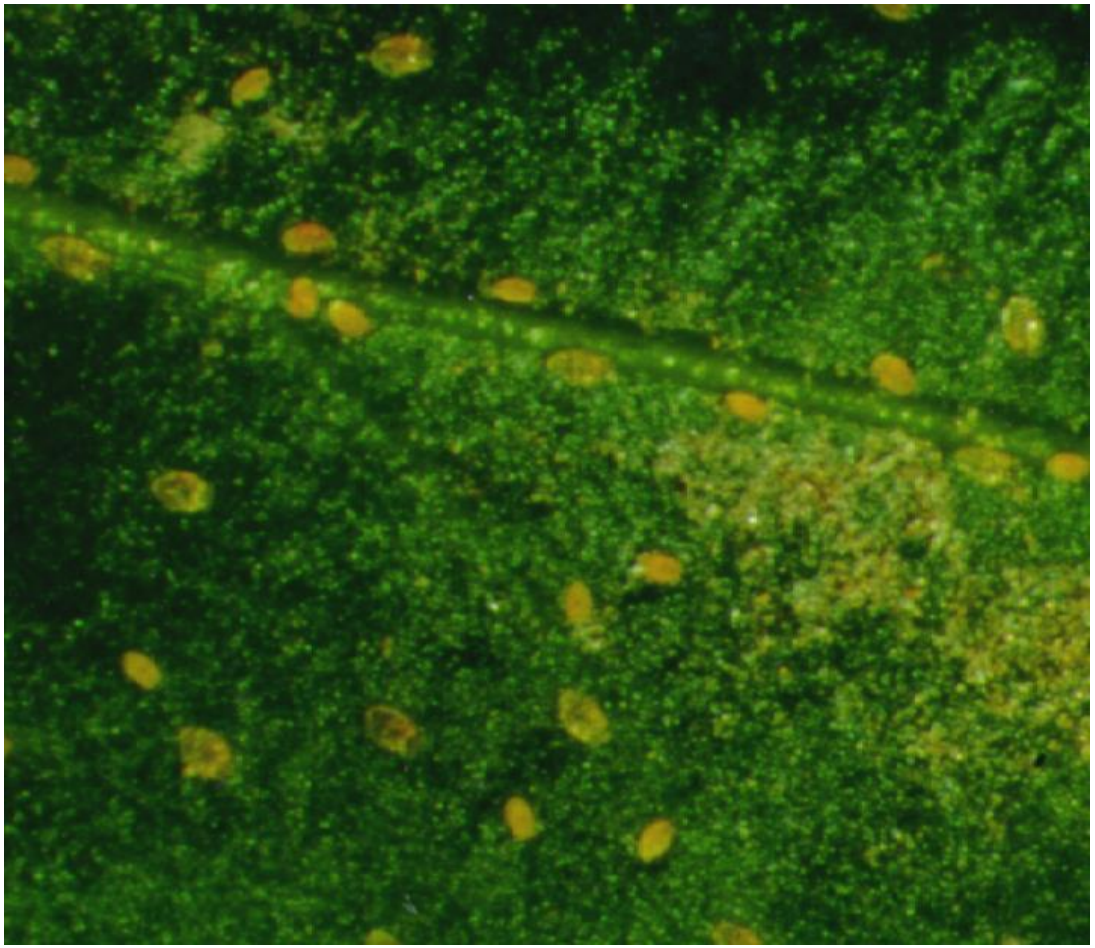
Euonymus Scale

- **Host specific** to euonymus
- Overwinters as a fertilized female
- Males appear as white flecks
- Females are oval and grayish brown

Euonymus Scale



Euonymus Scale “Crawlers”



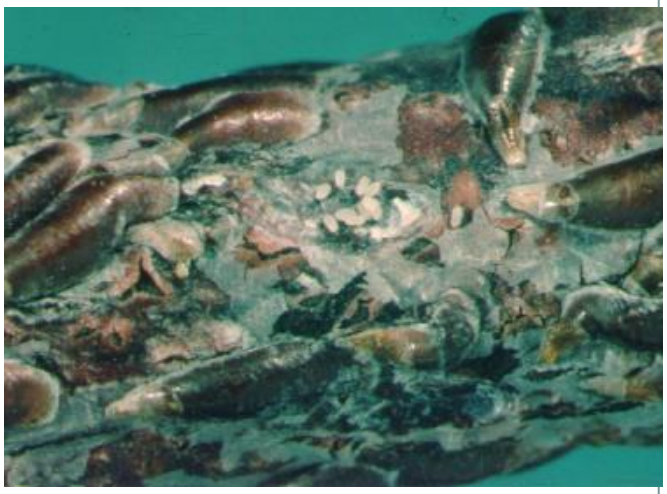
Pine Needle Scale

- Host specific to pine and spruce
- Overwinters as an egg
- Appears as **white flecks on needles**

Pine Needle Scale

Oystershell Scale

- Broad host range
- Overwinters as an egg
- One generation per year north of I-80
- Two generations per year south of I-80



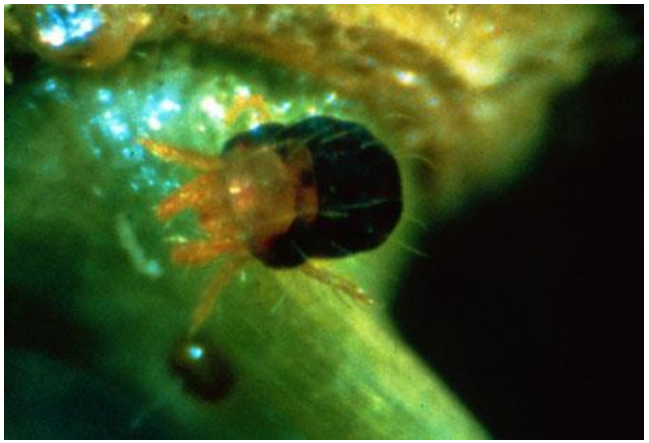
Plant Dieback Due To Heavy Scale Populations

Mites

- Populations build rapidly
- Form fine **silk webbing**
- **Bronzing** of the foliage

Cool Season Mites

- Spruce spider mite



Spruce Spider Mite

- Common to spruce and pine

Warm Season Mites

- Two-spotted spider mite
- European red mite
- Honeylocust mite

Two-Spotted Spider Mite

- Broad host range
- **Major pest of ornamental plants**

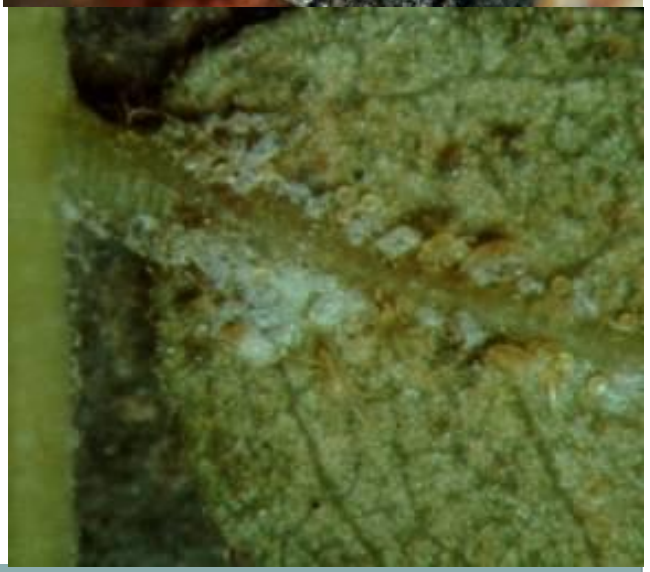
European Red Mite

- Economic pest of apples and evergreens

European Mite Damage on Arborvitae

Honeylocust Mite

- **Host specific to honeylocust**
- Prevalent on stressed trees
- **Overwinter as eggs**



Honeylocust Mite

MANAGEMENT OF SAP-FEEDING INSECTS

- Keep plants healthy and vigorous, but do not over fertilize
- Monitor and inspect plants for infestations
- Conserve natural enemies
- Chemical management
  - Apply crawler sprays
  - Apply dormant oil applications for overwintering eggs and immature scales
  - Apply IGRs to disrupt molting of crawlers
  - **Systemic chemicals will work on soft scales , but not on armored scales**

SUMMARY

- Aphids
- Lacebugs
- Scales
- Leafhoppers
- Plantbugs
- Mites

END OF PRESENTATION