ACLP II
ADVANCED
ARIZONA CERTIFIED
LANDSCAPE PROFESSIONAL

Invertebrates that damage plants

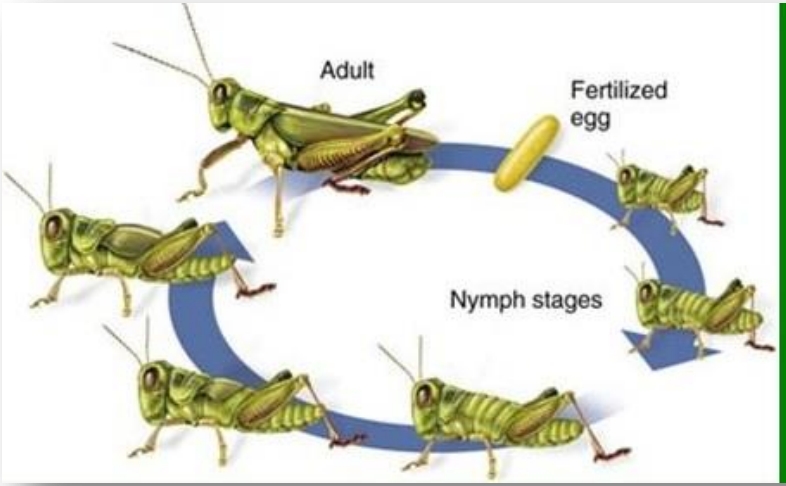
PLANT PESTS

Insect Life Cycles

- Incomplete vs complete
- Terminology
- Examples
- Why it’s important to ID life cycle

Insect Metamorphosis

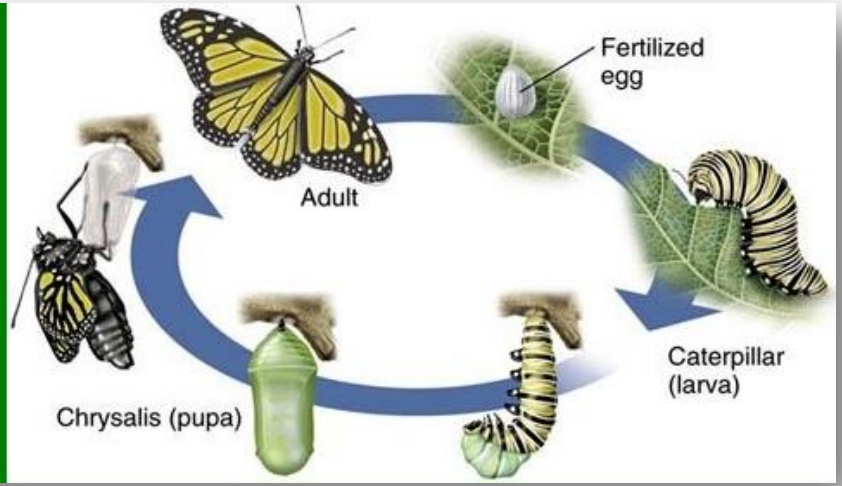
Incomplete



Young looks like a smaller version of the adult.

3 life phases

Complete

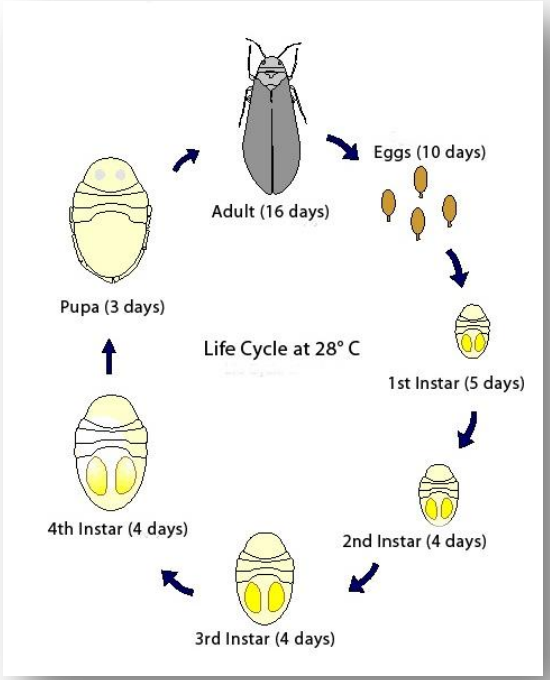


Young does not look like the adult.

4 distinct life phases

Whitefly Metamorphosis

Silverleaf Whitefly



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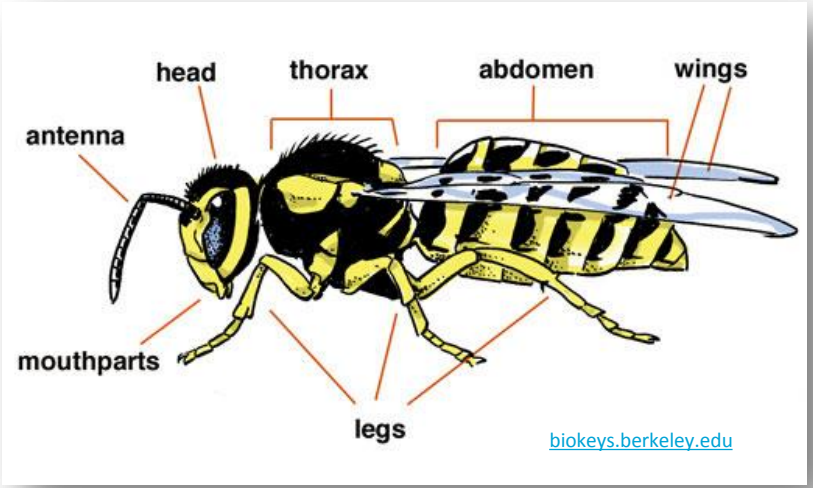
Greenhouse Whitefly

Photos by Surendra Dara and Jack Kelly Clark (4th instar)

Insect Anatomy

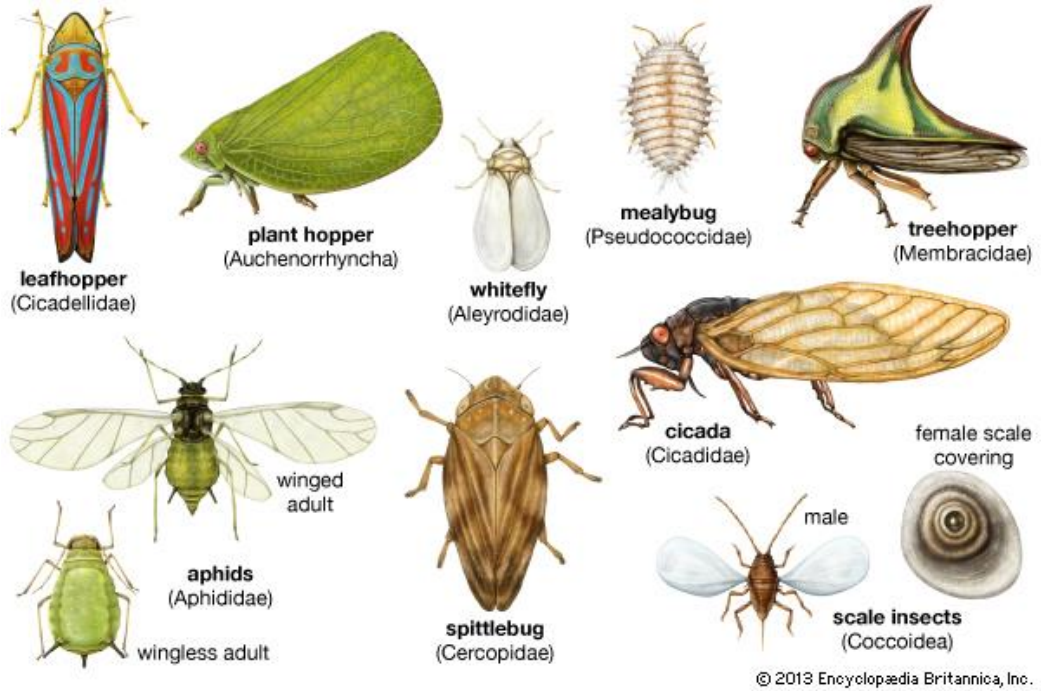
- Know terms for proper identification
- Field tools
  - Sealable hard container
  - 10X hand lens
  - Sticky traps
  - Entomologist



Thank you Target Specialty Products!!

Identification

- What type of damage are you seeing?
  - Chewing
    - Caterpillars, grasshoppers, beetle larvae & adults
  - Piercing/sucking
    - Aphid, whitefly, psyllid, scale insects,
  - Rasping
    - Thrips
- Is the damage random?
- Where is the damage on the plant?
- Tap branch on white paper
- Yellow sticky traps to monitor for flying insects



Piercing/ Sucking Insects

Whiteflies, Aphids, Psyllids, Scale

Whiteflies, Aphids, Psyllids

Damage

- Piercing sucking mouthparts suck sap from phloem, obtaining the amino acid, then excreting the sugars (**honeydew**)
- Chlorosis, stunting, leaves dry and eventually drops
- Compete defoliation may occur, or even death of smaller plants
- Leaves covered in honeydew may develop Sooty mold, which can reduce photosynthesis
- Honeydew also attracts ants

Sooty mold grows on honeydew, whether its on your hibiscus or your hardscape.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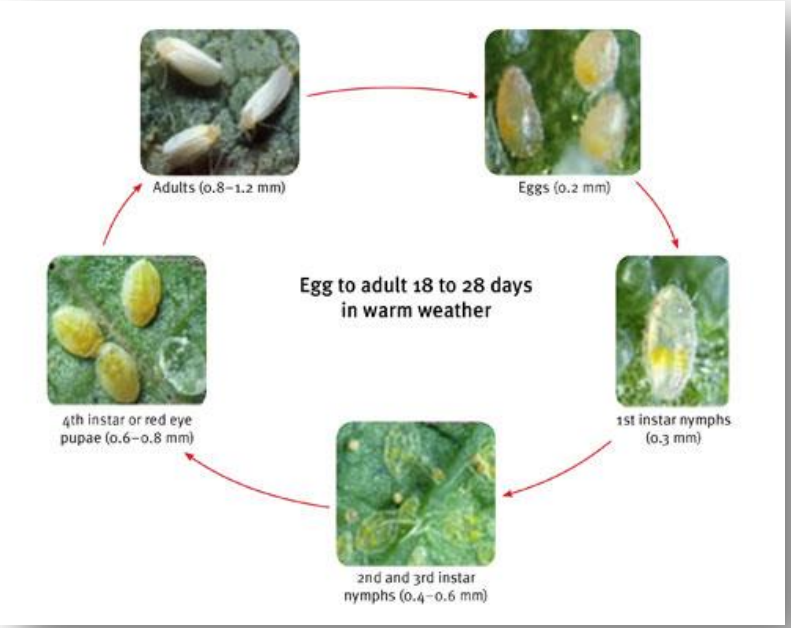
M. J. Raupp

Whiteflies

Identification

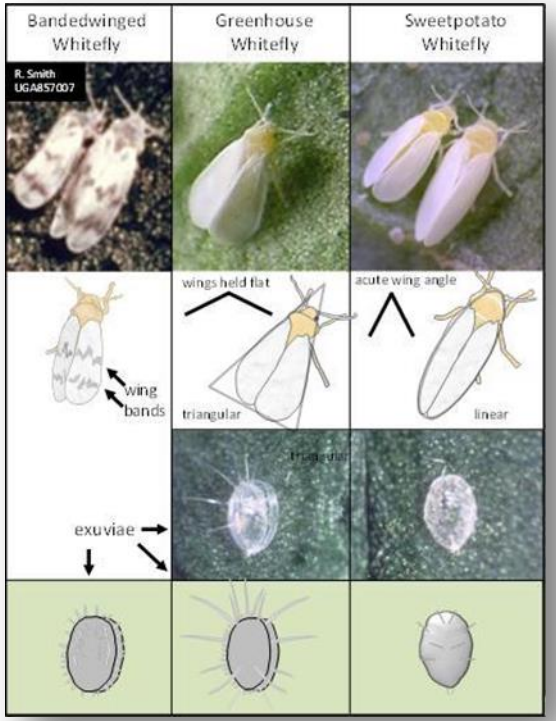
- Not true flies
- Populations increase rapidly in warm weather
- Incomplete metamorphosis: egg, 1-4 instar phases, adult
- All instars and adults feed on plant material
- Most often found on the underside of leaves
- Common hosts in our area
  - Lantana
  - Hibiscus
  - Ficus
  - Citrus
  - Ash



Whiteflies

Identification

- Adults are small with varying arrangement of white wings, depending on species
- Easiest to identify by their immature or nymph stage (also called **instar**)
  - Nymphs are flat, oval and clear to yellowish in color
  - Some have filaments, others do not
- Egg pattern on leaf may also help identify species



Ficus whitefly

Aphids

Aphids

Cornicles, which emit 'alarm' pheromones

Identification

- Incomplete life cycle
  - Various ages and sizes found together on leaf
- Colors may be green yellow, brown, grey or red
- Pear shaped with long antennae
- Abdomen have **cornicles**, which are helpful when identifying
- Adults are mostly wingless, while reproductives can have wings
- Give birth to live aphids through mild season (early spring & fall in our region)
- Can reproduce sexually or asexually
  - Are **parthenogenic** (no fertilization is needed for procreation)
  - Populations at times are only female, males are only required for the egg-laying process
  - Eggs produced in fall or winter for overwintering

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Woolly Aphids

Woolly Aphids

Identification

- Similar to other aphid species, but these have a woolly protective coating, making them difficult to treat
- Often attack AZ ash cultivars as new leaves emerge in spring
- Causes curling and distortion of new leaves
- Tree typically outgrows damage as temperatures climb in mid to late spring

Psyllids

Psyllids

Identification

- Generally host-specific, or closely related species
- Local species is unidentified, but often referred to as the ‘mesquite psyllid’
- Mesquite psyllid does most of its damage on mesquite varieties or *Caesalpinia cacalaco (*cascalote*)* in the late spring
  - Causes distortion of new growth and defoliation
  - Severe infestations can kill small trees if leaves can not emerge for an extended period of time
- Similar to aphids and whiteflies, they excrete honeydew, however it is often in a crystal-like sugar form on foliage

Whiteflies, Aphids, Psyllids

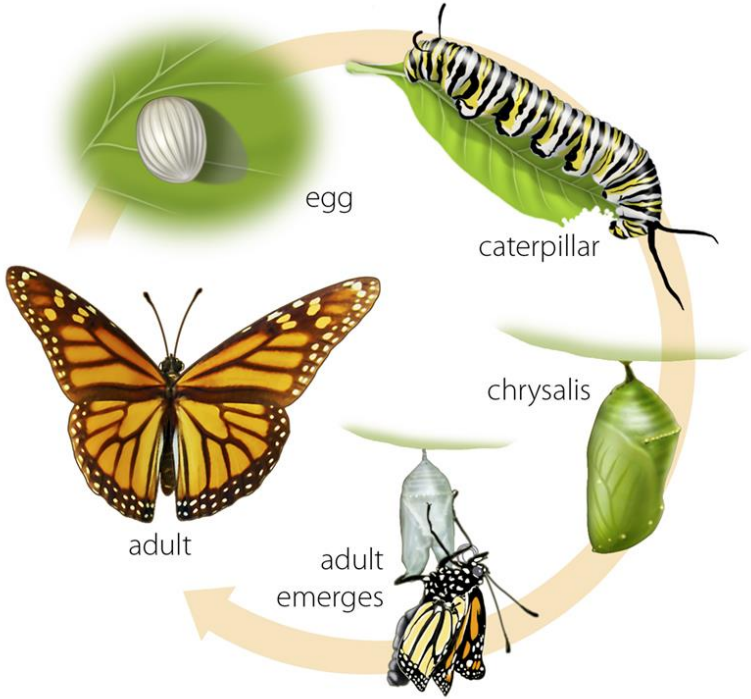
Treatment and Prevention

- Encourage natural enemies by selecting reduced-risk and narrow spectrum insecticides
- Rotate pest management products to help prevent pesticide resistance
- Use products targeting different life stages to break up life cycles on host plant
  - IGRs
  - Ovicides
  - Adulticides
  - Oils and soaps (used under 90° F)
  - Systemic insecticides if necessary
- The use of beneficial organisms may be helpful
- Hand removal of heavily infested leaves can reduce the number of adults that reproduce

Palo Verde Scale

Palo Verde Scale

- Little is known about this scale, which was first documented in the late 1800's in Arizona
- Occurring more and more, especially on hybrid species of palo verde
- Stay tuned for more information on this pest as it comes available to our industry



Lepidoptera Family

Sesame leaf tier and Genista moth caterpillars

Sesame Leaf Tier

Identification

- Lepidoptera family
- Complete metamorphosis
- Larvae feeds on *Tecoma spp., Bougainvillea spp.*
- 2 or more life cycles per season: spring, summer
- Feeds on tender new growth

Sesame Leaf Tier

- Larvae feeds on foliage, leaving behind papery brown tissue
- Produces silky web, which is used to ‘tie’, or roll leaf over, protecting itself while it feeds or when pupating
- Black specs are frass, commonly seen with other Lepidoptera pests

Genista Caterpillars

Identification

- 1” long caterpillar, yellow to green, with black & white markings
- Appear in spring on *Sophora secundiflora*
- Consume entire branch in a day, causing mass defoliation
- Prefer newer plant growth
- Form loose webbing on foliage
- Larvae are active during the day but may feed at night under mild temperatures
- Texas mountain laurel contains plant chemicals which protect them from pests, however this caterpillar is immune
- Look for small batches of eggs in overlapping clusters

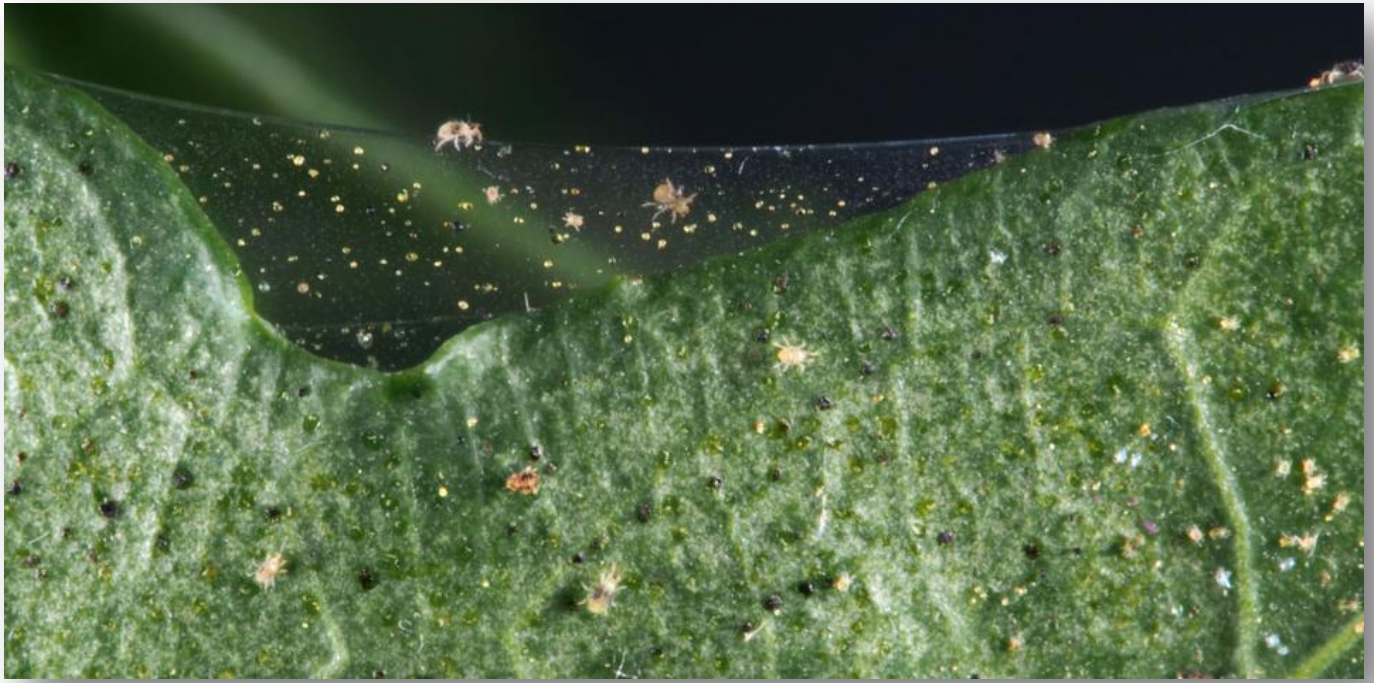
Genista Caterpillars

- Damage to new leaves is unsightly, but rarely does it impact plant's health
- Most often 2 life cycles per year occur in our region, starting in mid to late spring
- Other hosts include crape myrtle and honeysuckle
- Frass is often seen on leaves or under plant

Sesame Leaf Tier/ Genista Caterpillars

Treatment and Prevention

- Difficult to manage since populations do damage quickly, then are gone
- Remove nightlights, which attract moths
- Clip off branches with current infestations, remove in sealed bag
- Spray with Dipel, or *Bt* (*Bacillus thuringiensis*), which is a low-risk pesticide, which does not impact beneficials
  - *Bt* breaks down quickly on the foliage (est. 4 days), and the larvae must consume sprayed foliage to become ill from compound
  - Concentrate application on younger growth, where pest is likely feeding
  - Repeat application every 3-4 days until population is managed (follow label)
- Spray plant with Conserve CS (spinosad), another low-risk pesticide
- You must be licensed to apply these pesticides



Feeding Arachnids

Twospotted spider mites

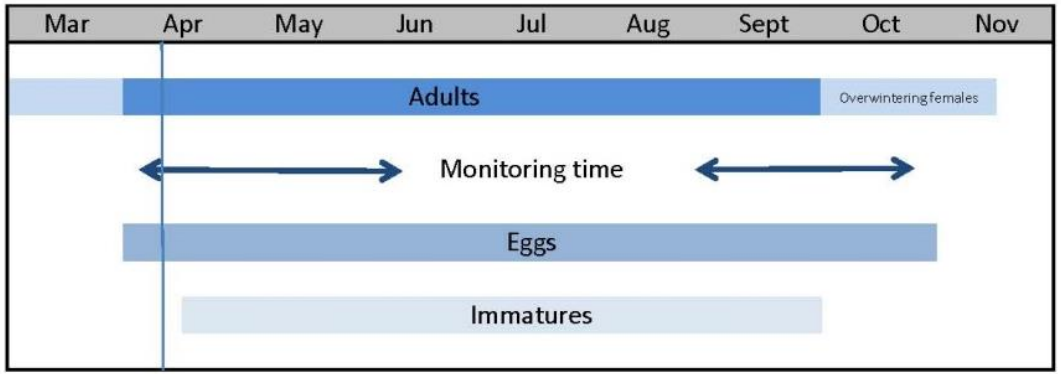
Twospotted Spider Mites

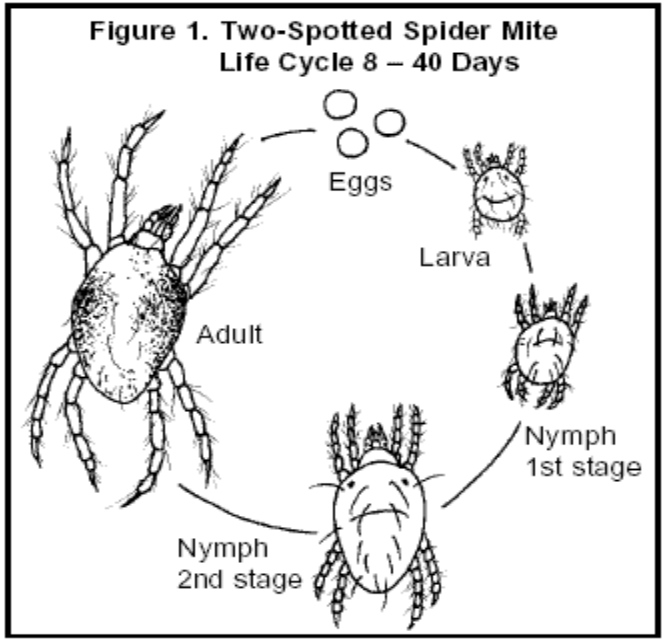
Identification

- Twospotted spider mites
  - Pierce plant cells and suck out fluids, causing **stippling** or bronzed appearance on leaf surface
  - Stunts plant's growth
  - Populations begin on underside of leaf
  - As infestations increase, webbing can be seen
  - Webbing can completely engulf leaf and petiole in extreme infestations

Twospotted Spider Mites

- Six-legged larvae hatch from egg and begin feeding
- Warmer temperatures speed up maturity and population development





Twospotted Spider Mites

- Both adults and juveniles feed
- Prefer hot, dry weather and dry, dusty or drought conditions
- Populations can explode after using a broad-spectrum insecticide, which kills natural predators, but does not impact mites
- Commonly seen late spring (sometimes as early as mid- March) through the fall in our region
- Highest infestations seen in April/ May and Sept./ Oct. in the Desert Southwest

Italian cypress is a preferred food source for the Twospotted spider mite

Twospotted Spider Mites

Treatment and Prevention

- Begin monitoring in the mid spring on common hosts:
  - *Leucophyllum*
  - *Salvia*
  - Rosemary
  - Cypress
  - Citrus

- If leaf surfaces are prone to dust accumulation, hose off foliage weekly (avoid spraying foliage in hot or direct sun, which can cause tissue burn)

- Develop treatment program if population reach threshold of 15 mites per leaf
- Select miticide which targets multiple life phases such as
  - TetraSan

Remember to use your IPM practices

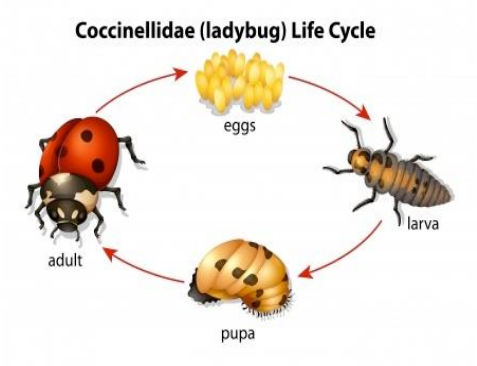
Action Threshold

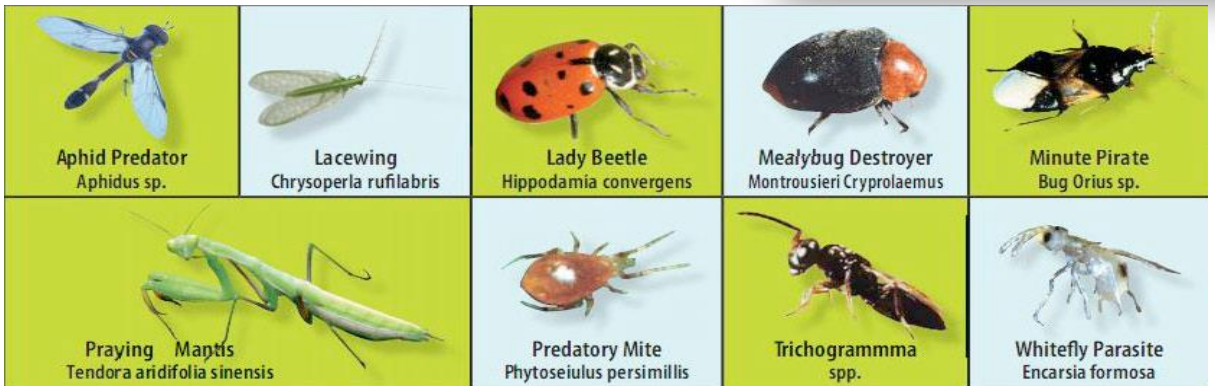
- Pest level at which it justifies a treatment
- How it is impacting you, your property, your client, the community?
- Other considerations before treating?
- Will you need a license to apply the product? Most likely yes!

IPM Strategies

- **Cultural practices**
  - Rotating crops
  - Irrigation management
  - Do not over fertilize, which can encourage pest outbreaks
- **Mechanical practices**
  - Clipping infested limbs or picking pests off limbs
  - Vacuuming
- **Sanitation**
  - Remove food source (remove weeds to help manage ants)
- **Biological control**
  - Parasites & predators and biocides
- **Chemical control**
  - Use of pesticides

Beneficial Organisms





Beneficial Organisms

The parasite *Encarsia pergandiella* has emerged from the round hole in the whitefly nymph at the bottom.

The T-shaped slit in the whitefly exuvia above indicates a healthy whitefly adult emerged.

The *Encarsia pergandiella* parasitizing whitefly instars.

Pesticides

Pesticide Classifications

- Contact
- Systemic
- Ingestant
- Insect Growth Regulator
- Fumigant

Pesticide Types

- Inorganic
- Organic
  - Natural
  - Synthetic
- Botanical