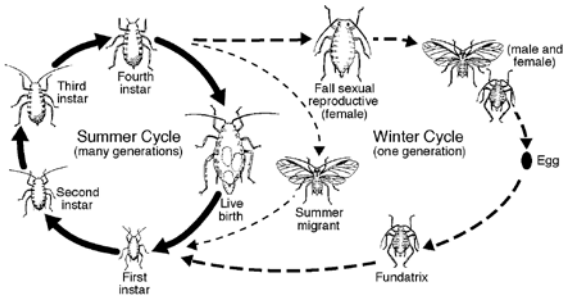
Aphid

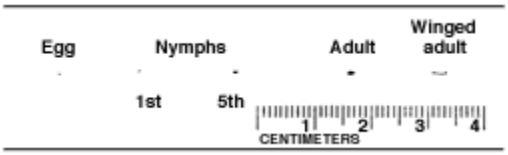
Adult aphid

young immature to adult



General life cycle of aphids.

Hand lens



1. **Adults:** Cucumber aphids are small aphids, approximately (1-2 mm) in length. Younger stages are less than 1 mm. Adult aphids can give birth to live young and reproduce quickly

2. 'Scouting'* the hoop house on a weekly basis is extremely important. Look for aphid under the leaves with hand lens. 'Scout' closely on cucumber plants that are close to openings such as doors, end walls and weeds inside the hoop house

3. Aphids can transmit several different plant viruses and it is important to have basic knowledge of the lifecycle and stages of development

4. What to do if you have various populations using a hand lens
   0 to 5 adults per leave- monitor closely on leaves
   6 to 20 adults per leave- use spray program or introduce biological control
   21 and above per leave- continue spray programs or flood hoop house with biological control agents

***scouting means routinely walking the hoop house and looking at plants**

http://www.ipm.ucdavis.edu/PDF/PESTNOTES/pnaphids.pdf

Vegetable Leafminer

Biology

Leafminer adults are small, black and yellow flies.

Eggs are laid in leaves and larvae feed between leaf surfaces, creating a meandering track or "mine." At high population levels, entire leaves may be covered with mines. Mature larvae leave the mines, dropping to the ground as pupae. The life cycle takes only 2 weeks in warm weather; there are seven to ten generations a year.

DAMAGE

Leafminer feeding results in serpentine mines (slender, white, winding trails); heavily mined leaflets have large whitish blotches.

Figure 1 Leafminer pupa and larva

Leafminer larva and pupa

1. Identify the stages of the insect by using hand lens
2. Adult leafminer flies generally are seen on top the leaf. Female lays eggs inside leaf. Pupae(yellow in color) occur prior to adult emerging
3. Scouting* the hoop house on a twice weekly basis is extremely important. Make sure screens are in place so leafminers cannot enter production area.
4. Use spray program or introduce biological control when seeing active adults
5. A monitoring technique for leafminers is to place outside the hoop house plastic trays about 12 by 15 inches in size beneath plants at several randomly chosen places in the field. Mature larvae that drop from foliage accumulate on the trays and pupate there, providing a measure of leafminer activity and a means to control future outbreaks

Sanitation

Remove all plant debris and weeds from the hoop house. Begin cleanup immediately following harvest and dispose of debris as far as possible from the growing area. Totally cover or bury debris to reduce the dispersal of any emerging leafminer flies.

***scouting means routinely walking the hoop house and looking at plants**

http://www.ipm.ucdavis.edu/PMG/r783300911.html#DAMAGE

Spider mite

Biology

The spider mite goes through five stages, namely egg, larva, first nymphal stage, second nymphal stage, and adult. All stages can be observed in the crop.

Damage symptoms

- Spider mite larvae, nymphs and adults feed on the underside of the leaves and cause yellow spots, later even yellow leaves. This results in decreased plant growth and production. Finally the crop may die from the infestation.
- Nymphs and adults produce webbing that can cause cosmetic damage to the crop. If large numbers of spider mites are present, plants may be completely covered with webs.

- Local mites are Two spotted spider mites, and are tiny (0.25 to 0.5 mm long) eight-legged mites with two large spots on both sides of the body. Mites are typically found on the undersides of leaves, but may colonize entire plants during outbreaks. Silk webbing on the undersides of leaves, and bronzing, stippling and burning of leaves are characteristic signs of spider mites. Damaged leaves drop from the plant.

Detection in hoop houses

1. For detection of spider mites, use a magnifying glass or hand lens
2. Examine the undersides of the leaves closely for adult mites and webbing. Under side of leaves will start to yellow
3. Use a sheet of white typing paper beneath the leaves and strike the foliage sharply. The mites will fall onto the paper and can be more easily observed and identified than on the green foliage.
4. What to do if you have various populations:

Make sure mite screen on hoop house is in place in order minimize mite outbreaks
For low populations of less the 10 mites rinse the leaves of the plant
More than ten mites per leave start spray program or use biological control
Webbing indicates that high population are present and use of spray program is only effective means of control

http://entnemdept.ufl.edu/creatures/orn/twospotted_mite.htm#management

Tomato russet mite

Tomato russet mites are so tiny they cannot be seen without a hand lens. You will see the bronzing they cause on leaves first. Russet mites are conical in shape and yellowish, tan, or pink. Russet Mute size is less than .2 mm. A dissecting micro scope is needed to identify this mite

Identification of species

Damage

Leaves and stems damaged by mites develop a greasy appearance, then dry out and turn bronze. Damage starts at the base of the plant and moves upward. In hot weather when mite populations explode, plants may be defoliated. Damage can occupy with hoop houses where high temperatures occur

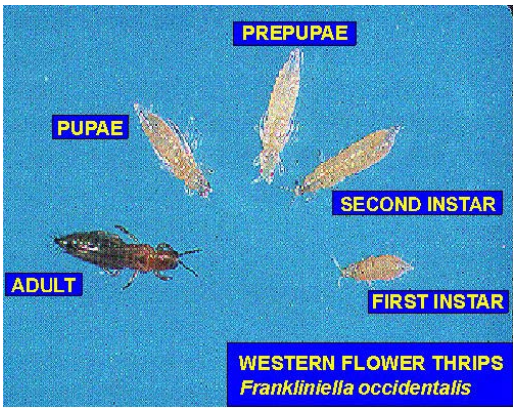
Solutions

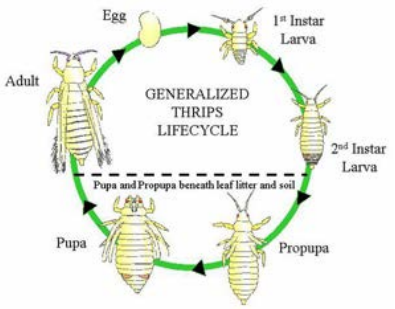
Both sulfur dust and wettable sulfur are effective for russet mite control. Do not grow tomatoes near petunias or any solanaceous plants, such as potato, as they are other hosts of the russet mite. Night time sulfur burning is also effective control

Russet mites

Russet mite damage

Thrips





Thrip biology and lifecycle

Hand lens for seeing thrips. Use yellow or blue sticky traps to monitor thrips & winged adult thrips

1. Use yellow sticky cards* or make yellow sticky boards* to monitor thrip populations. Crops which have thrips include wheat, onions, melons, cucumbers, tomatoes, peppers and other vegetables.

2. Look into the flowers of cucumber, tomato, eggplant and determine if thrip larva to adults are present.

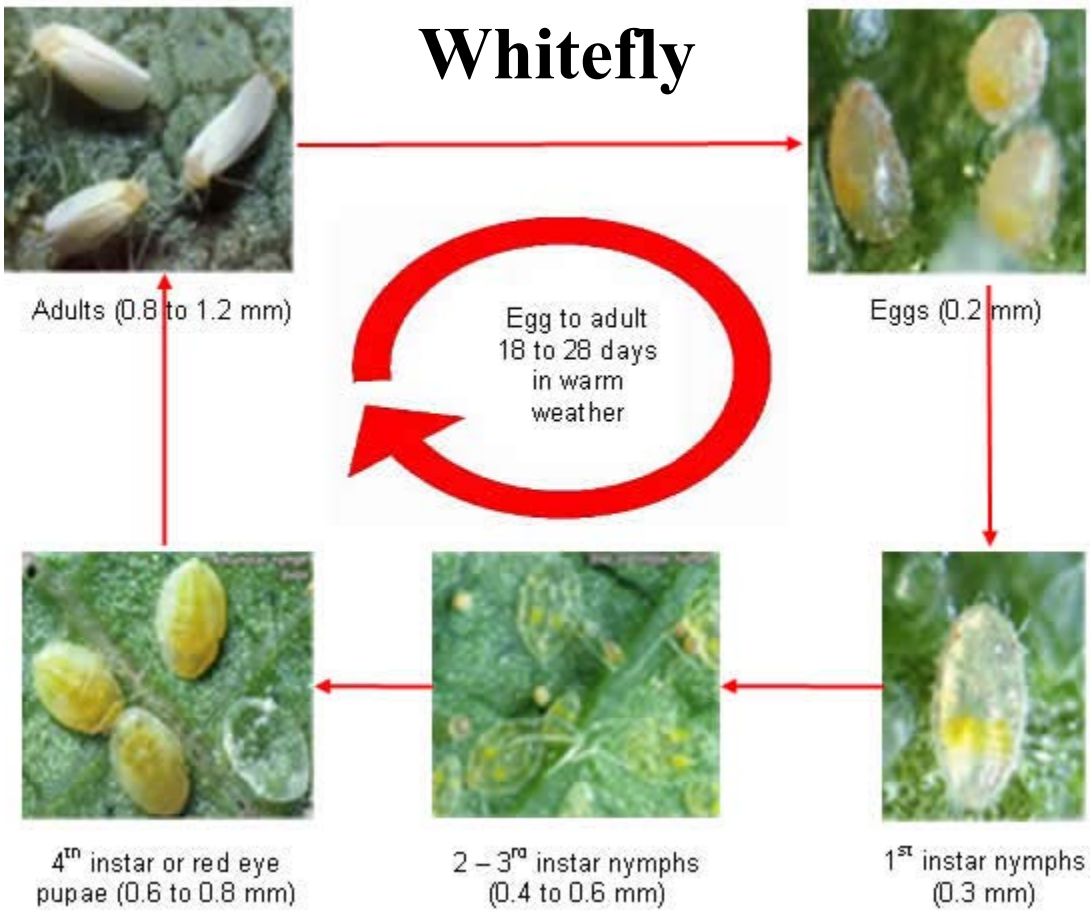
3. Establish scouting program to determine infestation of thrips. Scout every 3 to 5 days

4. What to do if you have various populations using sticky cards(15mm by 30mm)
   -0 to 5 thrips per 2 by 2 mm means low number
   -5 to 15 thrips per 2 by 2 mm card means population is building
   -Greater than 15 thrips per 2 by 2 mm begin spray program

*Sticky cards can be made with bright yellow paint with application of clue 'Stickem Special'

*Sticky boards can be made by painting bright yellow paint and then applying 'Stickem Special'

Source: http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7429.html#LIFE



1. Identify the stages of the insect by using hand lens
2. Use Sticky cards to identify white fly populations
3. White fly generally is under the leaf. Female lays eggs in a semicircle
4. Scouting the hoop house on a weekly basis is extremely important
5. Sticky cards help the grower to determine the overall stage and size of the whitefly population
6. Whiteflies transmit several different plant viruses and it is important to have basic knowledge of the lifecycle and stages of development
7. What to do if you have various populations using sticky cards
   - 0 to 5 adults per card- monitor closely
   - 6 to 20 adults per card- population growing.
   - 21 and above per card- use spray program or introduce biological control

Source: http://www.ipm.ucdavis.edu/PMG/r116301211.html#DAMAGE