# Save time for sanitation

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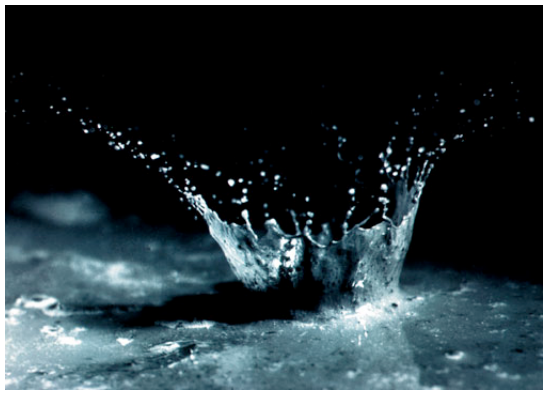
# Sanitation from the ground up

- Start with your floors
  - What are they covered with?
    - Soil
    - Gravel
    - Landscape fabric
    - Concrete

# What are the issues?

- Soil splashed spores and disease structures
- Weeds
  - Insect host and overwintering site
  - Disease host
- Insects
  - In the soil




When dry the seed pods have a triggering mechanism that expels the seeds in all directions from the slightest touch.  Seeds can be propelled for several feet.

They are also sticky and can stick to walls and benches – and even be mistaken for insects

# Which is best?

- All have their issues!
  - Soil
  - Gravel
  - Landscape fabric
  - Concrete

# Soil


Ease of cleaning
"Hiding places"

# It’s all good when its new but . . .

# Cleaning may be easier

But drainage may be an issue . . . to say nothing of cost

Dust?

# Sanitation from the outside in

- Things that you bring in
  - Accidentally
  - On purpose

# Accidentally

- Disease organisms
- Insects
- Weed seeds

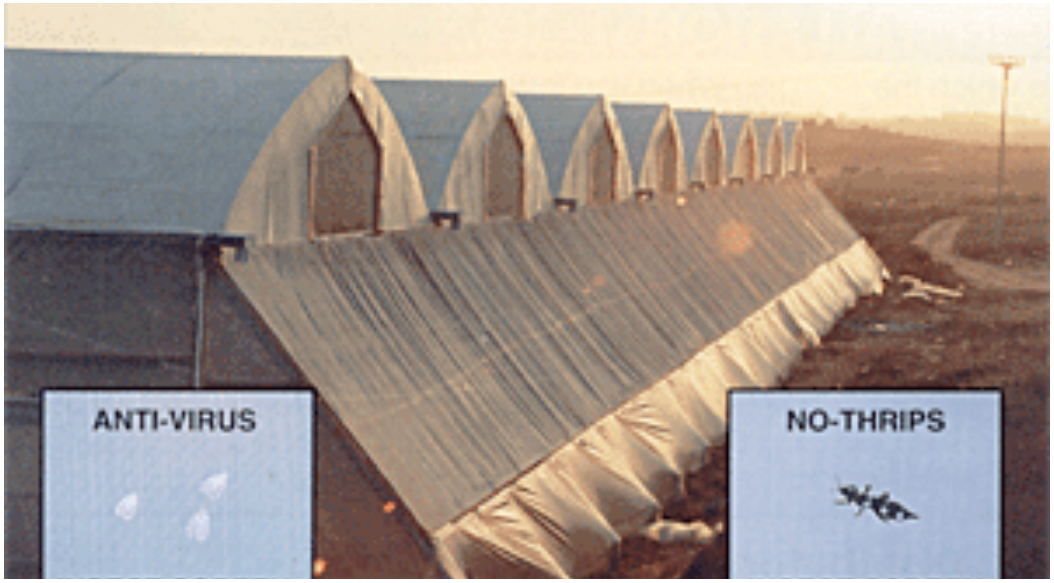
# How many of you use foot baths?

- Do they help?
  - *The disinfectant in these reservoirs is to be changed a minimum of twice daily, with debris in reservoirs being removed prior to replacement of the disinfectant into the footbath.*

- How about hand washing?

# How about insect screening?

- Issues?
- Even if you don't use screening, pay attention to the insects that can and do come in the vents
  - Timing
  - Beneficials?



# Why do you not want this man coming into your greenhouse?

Besides the fact that he is swinging a golf club and the fashion police might arrive . . .

# Weed management outside the greenhouse


# Maybe?

# On purpose

- Soil
- Pots
- Plants

# Do your soil bags ever get holes in them?



# Reusing or recycling pots

# Thielaviopsis

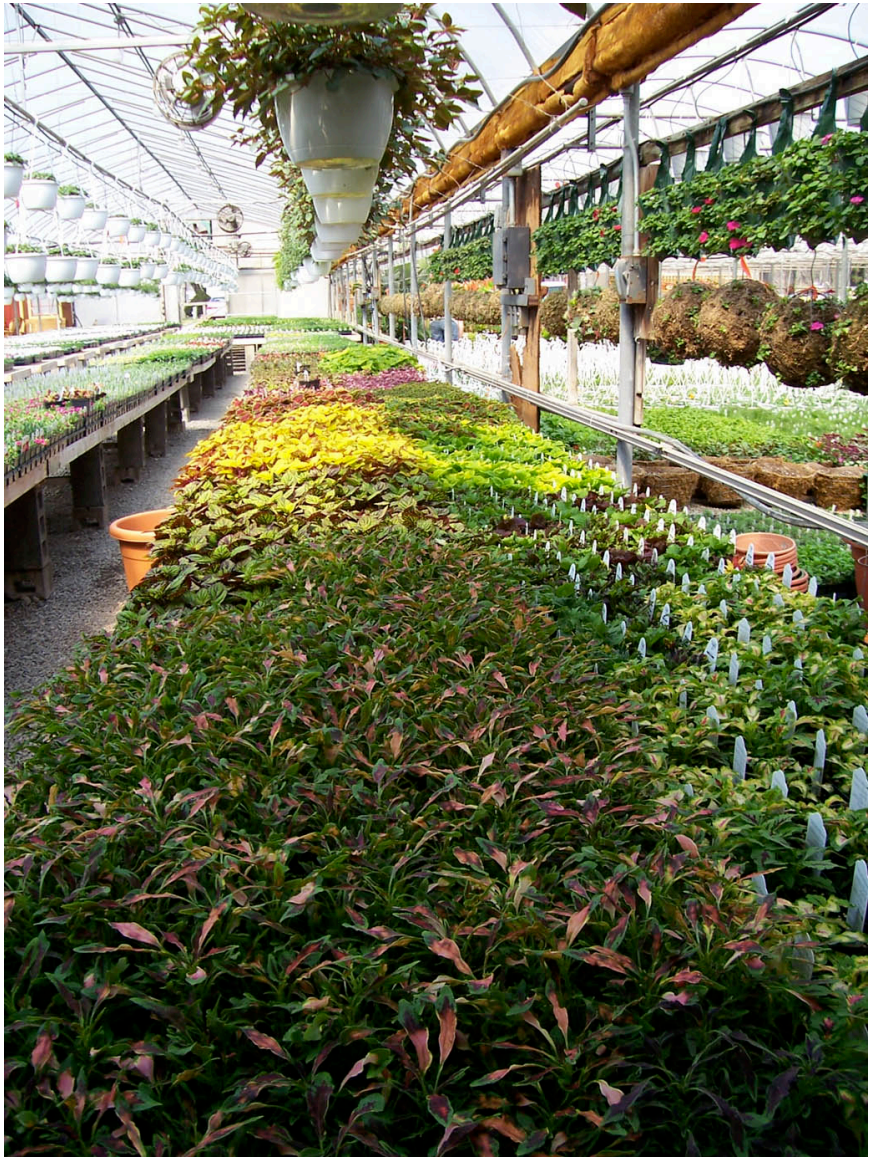

Important ornamental hosts include begonia, cyclamen, geranium, gerbera, kalanchoe, pansy, petunia, poinsettia, primula, snapdragon, sweet pea, verbena, and viola.

The fungus is soilborne and capable of prolonged survival in the absence of susceptible plants

# And then there’s the stuff we just forget . . .

Just like your mother
told you . . .

Just because you put it in the trash, doesn't mean it will stay there!




*Refuse container (32-gal.) and lid with the assembly combination designed to hold a 3x5-inch yellow sticky card to the underside of the lid. (Photo: Raymond Cloyd)*

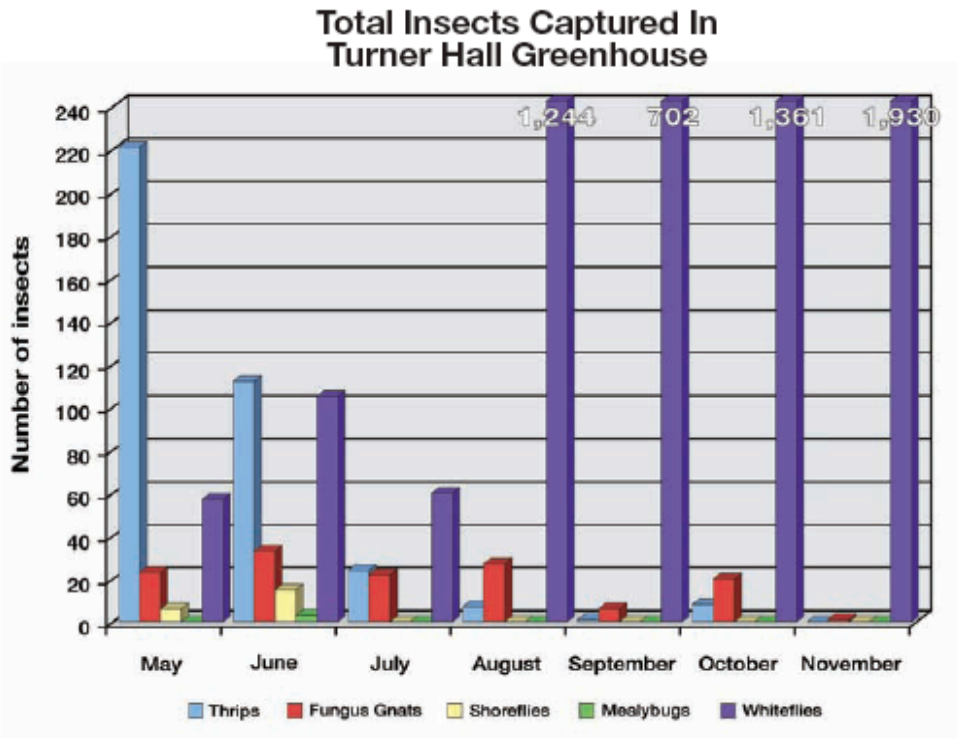
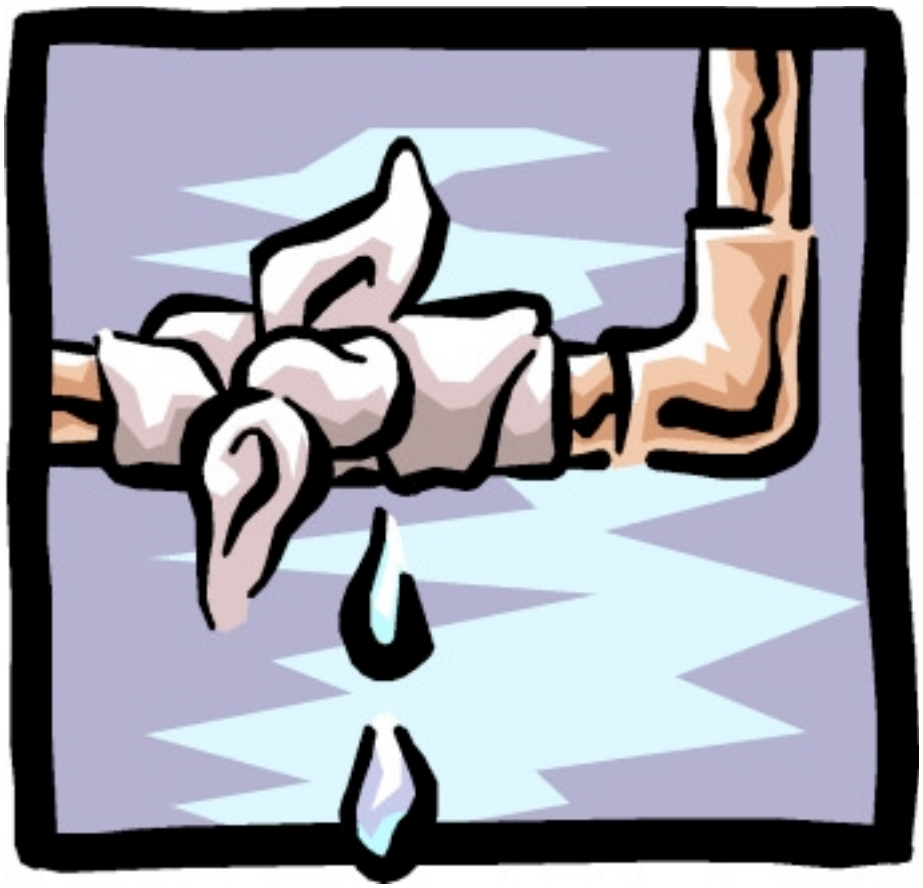



*Figure 5. Total number of insects captured per month from May through November 2005 in the Turner Hall greenhouse.*

Brian Hogendorp and Ray Cloyd

# Also true for disease spores



The shore flies will love you!

# Just a small reminder …

# If you can’t beat ‘em?

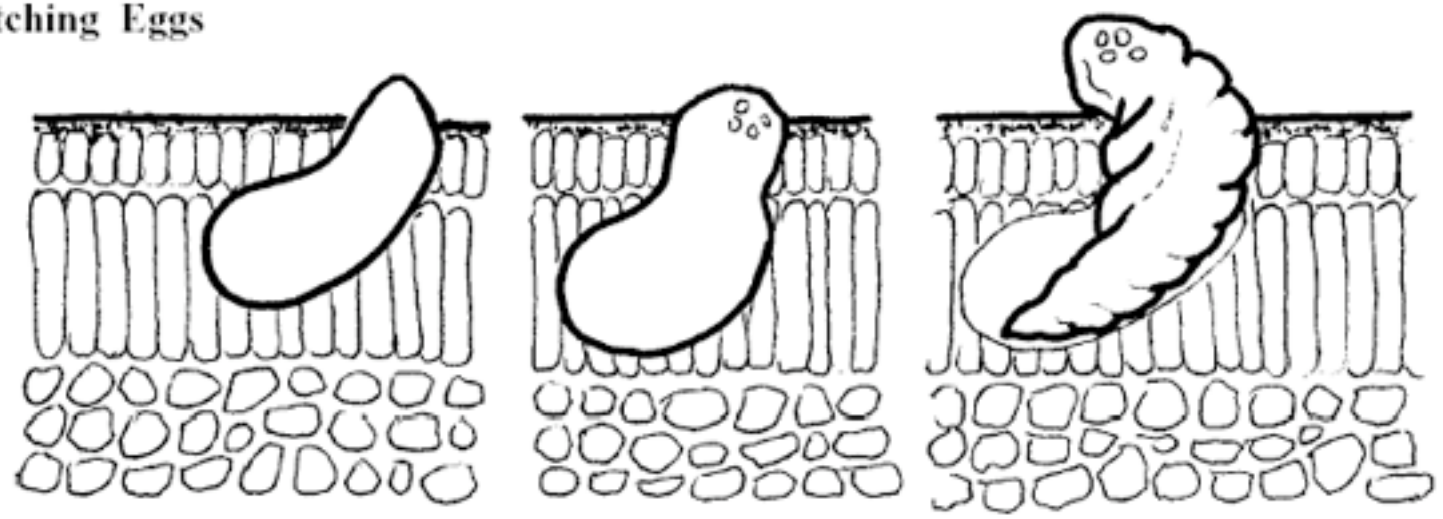
# Plants

- Examine all plant material coming into greenhouse
  - I can hear you thinking - *Oh, no problem – I have nothing else to do at that time*

- Do the best you can to examine all plant material coming into the greenhouse

# You can’t avoid all the problems but you can decrease the level

a) Hatching Eggs



# Stock or pet plants

- Sometimes they are essential or unavoidable
- Scout them more aggressively and cut them back or renew them as often as you can

# If it is sick or infested . . .

- Throw it out!
- The sooner the better
- Consider the cost
  - Additional pesticide use
  - Potential for infecting other plants
  - Loss in quality
- And treat around those you remove.

# So what are our best defenses?

- Vigilance!
  - Keep out anything you can keep out!
  - Pay attention to what is getting started
    - (This is an IPM talk – it must include scouting!)
  - Consider sanitation throughout production
  - Clean whenever you get a chance!
- Counter attack
  - Environment
  - Disinfectants

# Environment

- Know enough about the preferred environments of the plants and the pests to find the point where the plant is happiest and the pest is least happy
  - Don’t grow too wet
  - Ventilate your houses to reduce humidity
  - Don’t over fertilize your plants

# Let's freeze/cook them out!

- It might get some of them but . . .

- There must be NO plant material for diseases or insects to live on
- Both can form resistant stages that can survive adverse conditions

# Disinfectants

- Sodium hypochlorite
  - chlorine bleach
- Quaternary ammonium compounds
  - Greenshield, Physan, Kleengrow
- Hydrogen dioxide
  - Zerotol
- Chlorine dioxide (AI - Sodium chlorite)
  - Selectrocide
- Sodium carbonate peroxyhydrate – algaecides
  - Labeled for greenhouse in NYS?

# Things to know about disinfectants

- Labeled use
- Length of application
- Re-entry interval (REI)
- Corrosiveness
- Stability

*Where can you find all this information?*

# Labeled use

- Which organisms
- Which surfaces
- Direct plant application/phytotoxicity
  - Residues
- Potential for phytotoxicity
  - Zerotol
  - Terracyte – algaecide
  - Physan
  - Kleengrow – residual action is considered a benefit

# Length of application and REI

- Length of application
  - Chlorine bleach – 30 minutes
  - Greenshield – 10 minutes
  - Selectrocide – 10 min/100 ppm, 20 min 50 ppm
  - Zerotol – spray to runoff
- Re-entry interval
  - Depends on use?
    - Kleengrow – *REI does not apply to hard surface treatment*
  - Physan – 12 hours

# Corrosiveness

- Corrosivity
  - Bleach – definitely
  - Quaternary ammonium compounds – no

# Stability

- What makes solution inactive
  - Time
    - bleach
  - Sunlight
    - bleach
  - Organic matter
    - Bleach
  - Temperature
    - Bleach
  - Water pH
    - Zerotol – neutral pH?
    - Bleach – pH 5-7
    - Quaternary ammonium compounds pH 8-11?
  - Water alkalinity
    - Quaternary ammonium compounds
  - Soap?
    - Quaternary ammonium compounds

*Chlorine bleach has a half-life for activity of 2 hours*

# Sanitizer teststrips

- For quaternary ammonium compounds and chlorine


- Level of activity?
  - Greenshield active at 200 ppm
  - As diluted is at 400 ppm


- Griffin sells a ZeroTol test kit

# Level of activity desired?

- Bleach
  - 0-10 ppm residual
  - 0-200 ppm restaurant
  - 0-1000 ppm daycare
  - 0-10000 ppm healthcare
- Quaternary ammonium compounds
  - 0-400
  - 0-1000
  - Greenshield active at 200 ppm?  Label rate 400 ppm?

# If only it were easy!

- At least get relative numbers – when is activity decreasing?

# Thanks!

- And may all your plants be healthy!