



# **Using IPM in your Ag Program- Understanding Texas Laws**





## What we will cover

- Basics of School IPM regulations
- IPM for Greenhouses
  - **What are biocontrols**
  - **Exclusion**
  - **Cultural controls**
  - **Sanitation**
  - **Scouting**
  - **Identifying**



## What is School IPM

- 72<sup>nd</sup> Legislature Adopted Law
- Implemented by all ISD in 1995
- Requires all schools to have IPM Coordinator
- IPM policy adopted by school board
- Requires pre-notification, posting, and use of IPM principles in all areas of pest control
- Updated during the 80<sup>th</sup> Legislature – with changes



## Your role as Ag Teacher

- May be asked to be coordinator
- Assist with pesticide applications
  - Only persons with a non-commercial license with TDA or SPCB can make applications on school property (Ag programs exempt)
- Assist with insect identification
  - Ability to identify certain species to assist coordinator in relaying information to pest control company



## How you can help your IPM Program

- Find out who your IPM Coordinator is
- Identify areas that are part of your program
  - **Greenhouses, barns, planting beds, etc**
- Identify other areas that are in contact with your program
- Ensure that students and parents are aware of your program and treatments



## Keep good records

- Maintain copies of inspections and monitoring reports
- Plant or animal information
- Maintenance records
  - Weeding, pruning, etc
- Pesticide purchases and storage
- Pesticide applications
  - Trade name, AI, EPA reg, % used, solution, etc.

TDA Q527  
1/07

**Texas Department of Agriculture**  
Todd Staples, Commissioner  
Pesticide Applicator Record

Business Name \_\_\_\_\_ Address \_\_\_\_\_

Application Date	Time Started	Name of the person for whom the application was made	Location of Land Treated		Site Treated	Wind Direction	Wind Velocity	Air Temp
Product Trade Name		EPA Registration Number	Target Pest	Rate of Product Per Unit	Equipment ID #	Spray Permit Number		
Licensed Applicator's Name and License Number			Unlicensed Applicator's Name, if applicable		Total Acres or Volume of Area Treated	Total Volume of Spray Mix, Dust, Granules or Other Materials Applied Per Unit		
Additional Information								

Application Date	Time Started	Name of the person for whom the application was made	Location of Land Treated		Site Treated	Wind Direction	Wind Velocity	Air Temp
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Additional Information								



## What is IPM

- The best alternative to traditional pesticide-herbicide based pest control services.
- Provides effective control of insect and other pests while protecting the safety and health of children and preserving the environment.
- IPM is a decision making process to manage pest problems.



# The IPM pyramid

Pesticides

Biological  
controls

Physical /  
Mechanical controls

Cultural / Sanitation Practices





## Essential Ingredients for IPM

- Know your pest
- Establish thresholds
- Inspect
- Use multiple control tactics



## Biocontrol

- Enlists predators, parasites, or pathogens of pest organisms to help manage pests.
- Allows growers to use less chemicals and provide quality products



# Biological control agents

- Living organisms used to control pests





# IPM for Greenhouses

- Scouting
- Thresholds
- Understanding life cycle & insect behavior



## Scouting

- Cornerstone of successful IPM program
- Regular intervals
  - **Insects, diseases, and cultural problems**
- Uses sticky traps, pheromone traps, baits and visually inspecting plants
- Report forms, sample vials, forceps, pH meter



# Know your thresholds!

- Health / stress threshold
  - Threshold reached when pest damage causes a perceived health threat to humans or significant stress to plant (landscape)
- Aesthetic threshold
  - Threshold reached when aesthetic pleasure is affected by damage



# Know your thresholds

- Economic
  - Number of pests whose injury to the plants cause a crop loss in dollars greater than the amount of money managing the pest would cost.
  - The level that actually produces damage that is more expensive than intervention
  - When this threshold is met, it's time to treat.





# IPM Techniques - Prevention

- Clean transplants
  - #1 problem comes from infected plants
  - Know your grower and know your plants
  - Inspect plants immediately prior to planting
  - Ensure that greenhouse floors are not soil
  - Use insect screens on doors and ventilating systems
  - Keep outside doors closed at all times



## IPM Techniques - Prevention

- Cultural controls
  - Manipulates the greenhouse environment
  - Varying time of planting or harvesting, applying water and fertilizer, and rotating crops can all aid in healthy plants
  - Proper growing medium, controlling temperature & humidity, maintain nutrients at appropriate levels



# IPM Techniques - Prevention

- Sanitation
  - Weed management is essential – weeds hide pests
  - Maintain a weed-free zone surrounding the greenhouse
  - End of year clean-up in and around the house will help keep the area pest free
    - Pressure wash inside with disinfectant
    - Increase temp to over 80F – back them out



## IPM Techniques - Prevention

- Sanitation
  - Eliminate standing water
  - Remove areas of algae
    - Good source for fungus gnats & flies
  - Consider installing screens over vents
  - Soil or growth medium should be treated for pests and diseases through crop rotation and/or steaming
    - Will reduce carryover of pests like thrips or spider mites



## Between seasons

- Place yellow sticky cards in empty greenhouse to monitor for flying pests
- If pesticides are needed
  - **Choose insect specific**
  - **Have short residual**
    - pyrethrins
    - Insecticidal soap
    - Horticultural oils
    - Insect growth regulators



## Types of sticky cards



- Bright yellow cards most common
  - Trap majority of insects
- Blue cards to monitor for thrips
- Change every other week
- One card for 1,000 sq ft
- Reduce # of cards if using winged beneficial's
- Place cards 1 to 2 inches above plant canopy and move as plants grow



## Insect Identification

- Correct identification aids in correct control techniques
- Will need hand lens with 10x magnification



## Types of greenhouse pests

- Aphids
- Fungus Gnats
- Leaf miners
- Parasitoid wasps
- Shore flies
- Thrips
- Whiteflies



# Aphids



# Aphid natural enemies



Syrphid fly



Lady beetle

# Aphid natural enemies-immature forms

Syrphid fly larva



G128-1



Lady beetle larva



Lacewing larva

# Aphid natural enemies - parasitoids



Emerging parasitoid

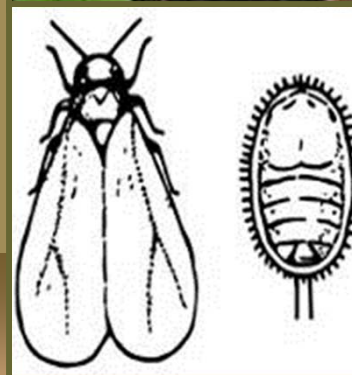
# Thrips

- Very tiny
- Meristem feeders
- Damage:
  - delay in growth
  - darkening of flowers
  - puckering and stunting
- Treat with systemics, spinosad



# Whiteflies

- Larvae are sap feeders
- High reproductive rate
- Found on undersides of leaves
- Often difficult to control



# Whitefly control

- Soaps and oils
- Systemics
  - **Neonicotinoids**
- Insect growth regulators
- Multiple treatments may be needed on 7-14 day cycle
- May arise as a secondary pest



# Spider mites

- Fast reproductive rate
- Live on leaf undersides
- Hot, dry conditions favor outbreaks
- Can be worsened by some insecticides
  - permethrin
  - imidacloprid





# Mite control

- Water streams
- Soaps and oils
- Bifenthrin
- Avermectin (Avid)
- New miticides





# Types of Biocontrol Organisms

- **Predators**
  - **Beetles, mites, mantids, and flies can be**
  - **introduced**
- **Parasitoids**
  - **Develop within the body of the host**
  - **Usually smaller than their prey**
  - **As the parasitoid matures, host is slowly killed**



# Types of Biocontrol Organisms

- Parasites
  - Commonly referred to as nematodes
  - Symbiotic association with bacteria lethal to soil-dwelling insects
  - 2 types – *Steinerema* and *Heterorhabditis*
  - Need moist soil and temp between 60 – 90F
- Pathogens – fungal spores
  - *Beauveria bassiana* – whiteflies, thrips, aphids



## Review

- Indicator plants
  - **Can provide early detection of predators**
- Proper pest identification
- Thresholds met
- Proper tactic selection
  - **Cultural, sanitation, biological or chemical**
- Recordkeeping
- Evaluation



## For more information

- Janet Hurley [ja-hurley@tamu.edu](mailto:ja-hurley@tamu.edu)
- 877-747-6872
- PA IPM program – Greenhouse IPM with an Emphasis on Biocontrols