They seek them here, They seek them there

How to effectively scout a greenhouse

Elizabeth Lamb

November 9, 2023

eml38@cornell.edu

And more about scouting with John Sanderson at 1:30!

Who got the literary reference?

How many scout or have a scout already?

What is scouting?

- Consistent, recurring inspection of your plants to identify plant problems and…
  - Do more effective pest management
  - Save money
  - Have better plant quality

- Usually combined with identification

Scouting is the basis for all IPM

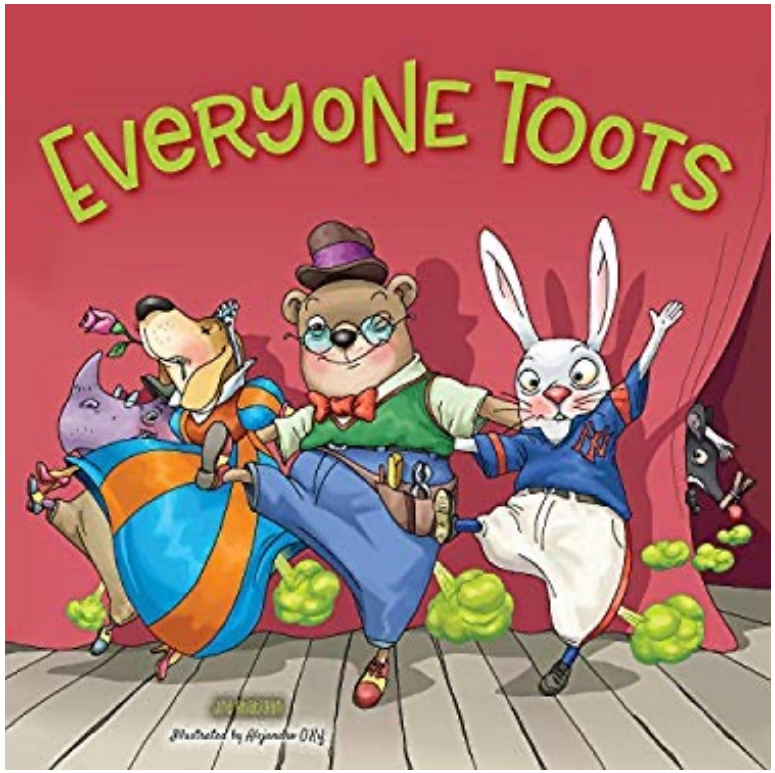
1. Monitoring/scouting
2. Pest identification
3. Emphasize cultural, physical, and biological controls
4. Determine if your controls are working
5. Go back to 1 (not an entirely linear process)

Who scouts? Everyone scouts!

- Dedicated scout – internal or external

- Empower all workers to mention what they see
- If scouting is built in to daily activities, it is less likely to be lost when things get busy

- Attention to detail
- Organized
- Good communicator



Who scouts at your greenhouse?

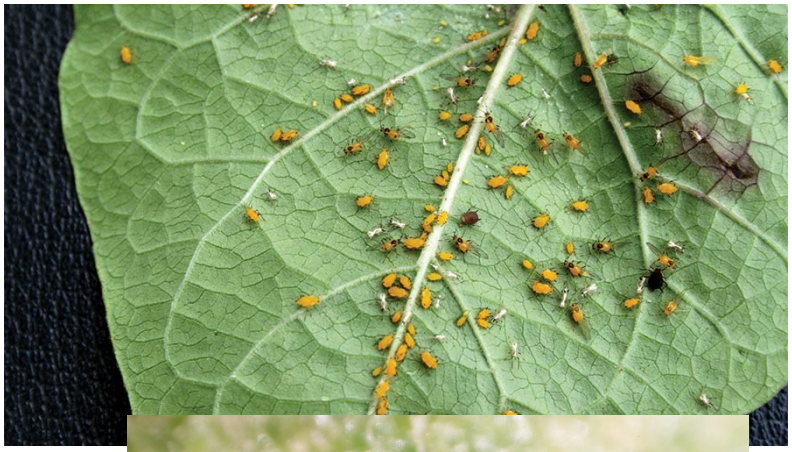
The role of the scout is to inform the head decision maker about pest problems.

Cheryl Sullivan

What are you trying to find out?

- Which pests?
  - behavior
- How many?
- When do they arrive?
  - Earliest detection possible
- Where are they
  - Which crops?
  - Hotspots?
- Is your management method working?
  - Track populations over time

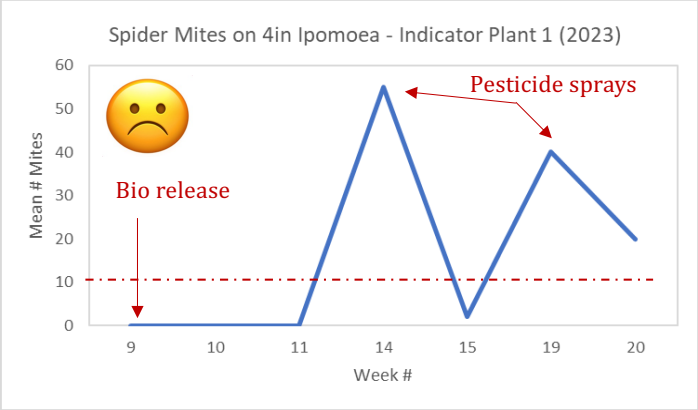
- All this information goes into your records!

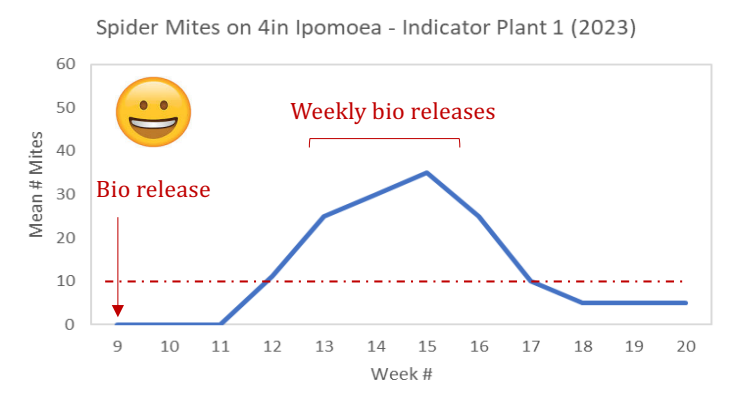


What does this sticky card tell you?

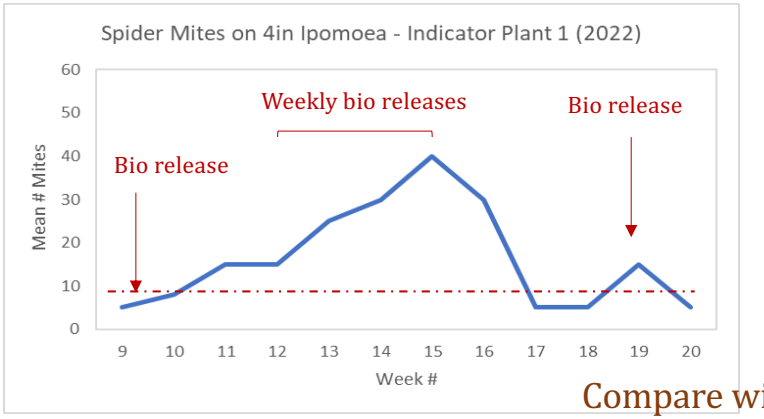
Interpreting Data

(from Cheryl Sullivan)





= action threshold



Compare with the past….

Basic Scouting Tools

- Magnifiers (at least 10X)
- Sticky traps
- Flagging tape/survey flags
- Data sheets, notebook, app?

MAGNIFICATION!

Nicole Keyes

Handlens – at least 10X

And know how to use it ☺

Indigo equipment

Amazon

With Optimizer →

← With phone Camera

With hand lens ←

With hand Microscope →

Also handy for taking pictures for ID

Nicole Keyes

Do you have....

- A handlens
- An Optivisor
- Additional lenses for your phone
- A handheld microscope
- A dissecting microscope

Resources

- Newsletters
- Books
- Training events

Additional Scouting Tools

- Disposable nitrile gloves for safety of scout
- White surface (e.g., paper) for plant taps
- Apron to hold all the stuff
- Technical resources (ID, lifecycles, pesticide labels, etc.)
- *Contact information for diagnostic labs to send samples*

Other tools you recommend?

Sticky Traps

- Adult flying insect pests
  - Useful but not the only scouting you need to do
- Standard is 1 trap per 1,000 sq. ft.
- Position just above crop canopy
- Also near very susceptible crops, doors, vents
  - Potential hotspots
- Examine on a regular schedule and record the counts
  - Number the cards or have a location code on your scouting form
  - Same time of day each time
  - Average counts?

Can use blue sticky traps for thrips, though yellow works fine

Do changes in light spectrum with different types of lights affect how insects see trap color?

Test them for yourself – new colors…

Has anyone tried other colors?

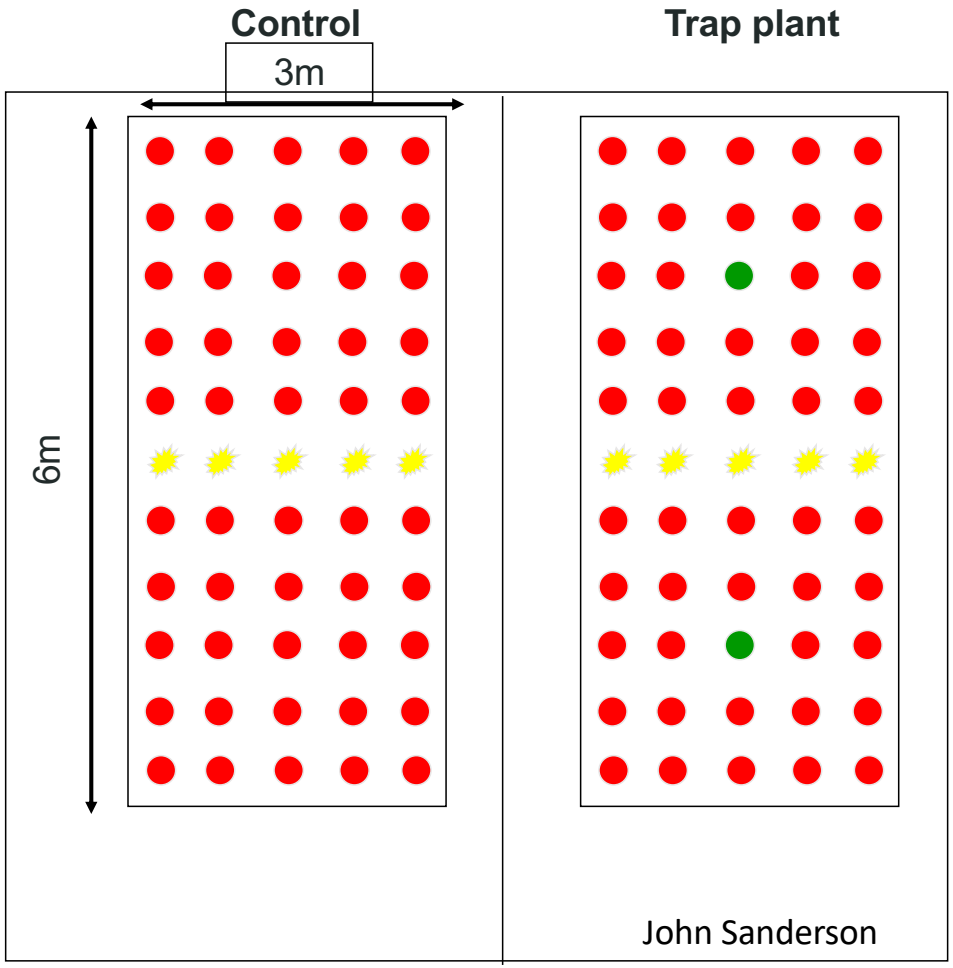
Sentinel plants

- Usually the crop itself
- Often to see if management system worked
  - Mark a plant – observe before and after treatment

Trap/Indicator plants

- Some other plant brought in to show presence of – or catch - pest
  - More attractive than crop
  - May be different cultivar
  - Need to manage them
- You need the correct species for the crop and pest you are looking at

Trap crop density experiment



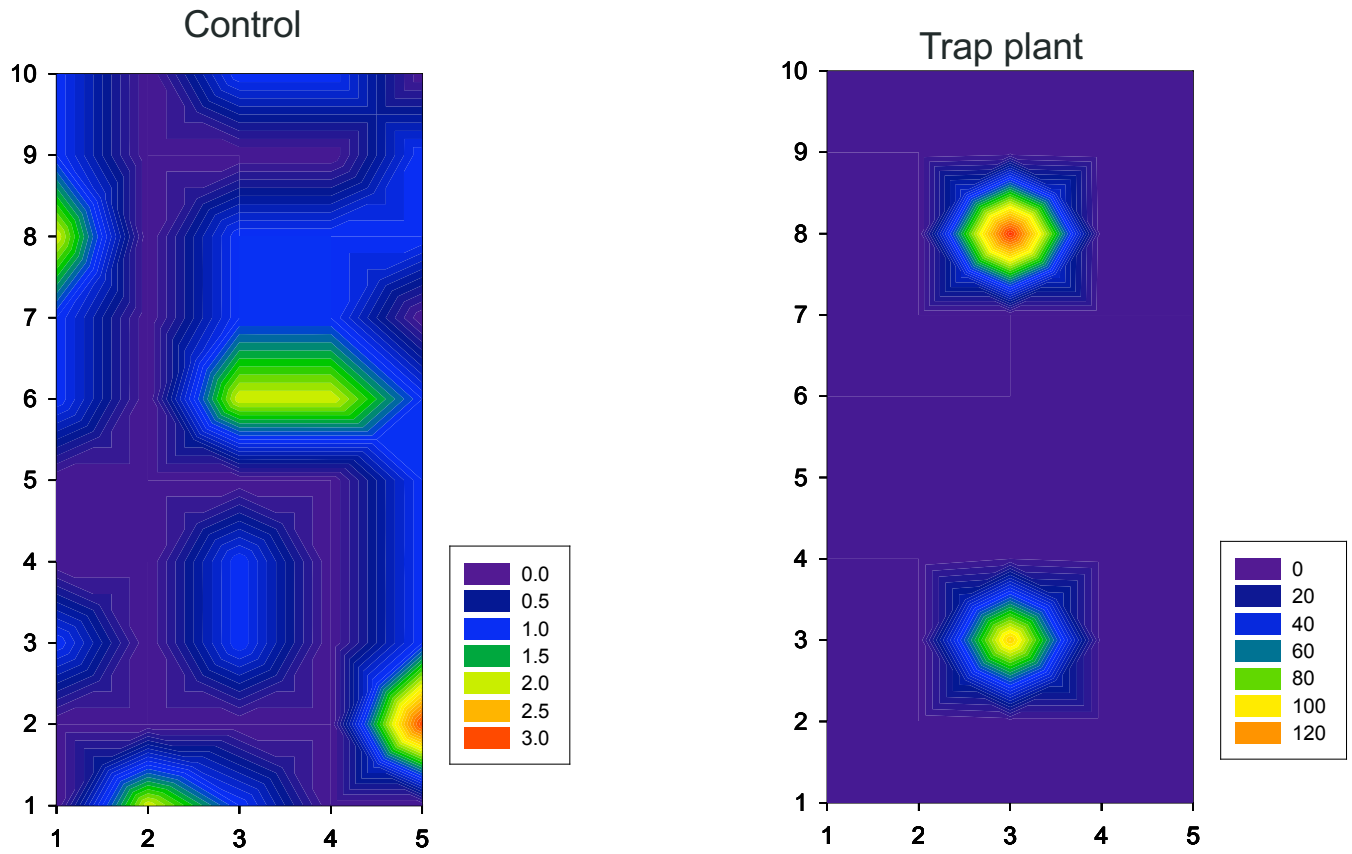
Poinsettia

Eggplant

Release

1,500 greenhouse whiteflies

10d



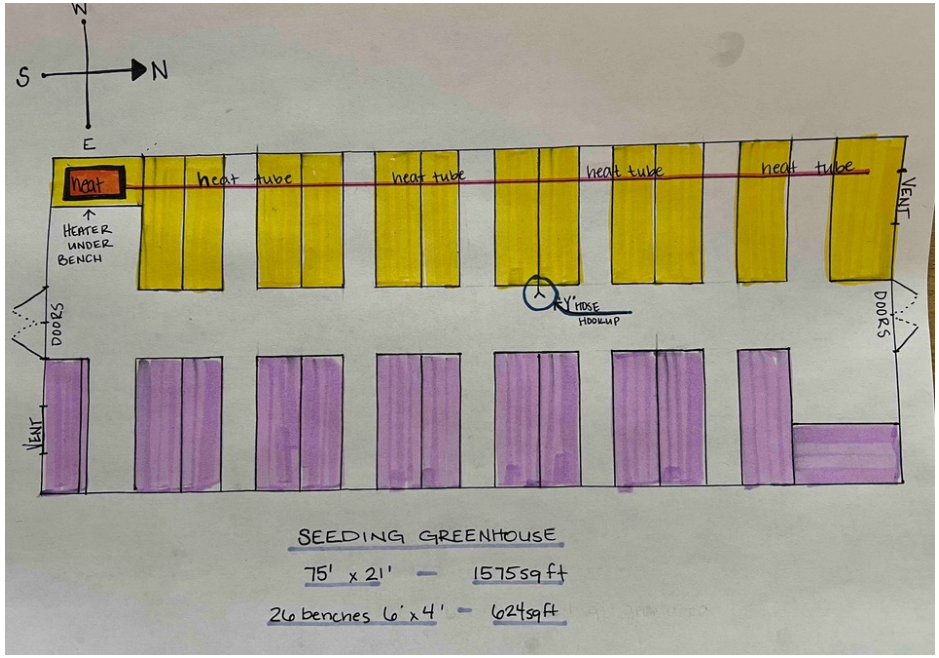
Greenhouse whitefly

You must DO something with the plant once it has attracted the pest

- May be removed once it is infested
- Or used as a site for biocontrol

Create a scouting plan

- Where will you be collecting your scouting data?
  - Plants, benches, floors
  - Headhouse
  - Outside
- What are you scouting for?
  - Past history
- When are you scouting?
  - Pre-crop
  - Incoming plant material
  - During production
  - Before shipping
- Who is scouting?



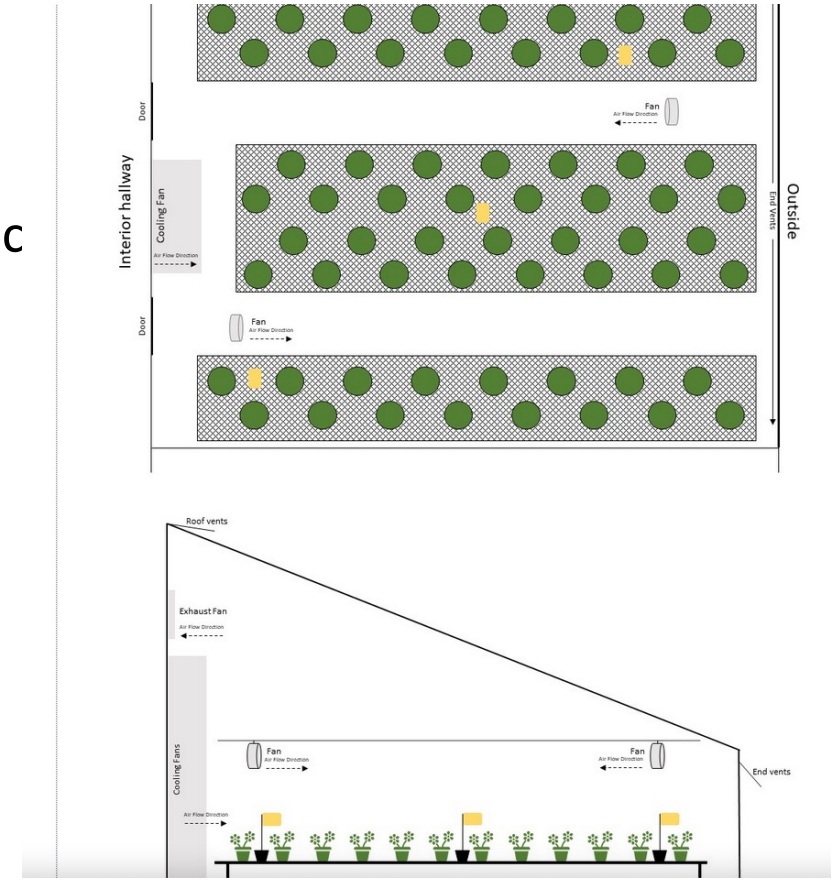
Richards

Pest Management Unit (PMU)

- Divide the growing area into units that can be adequately scouted in a timely manner each week (i.e., divide into PMU's)
  - Look at the whole PMU for anything that looks 'off' first
  - Scout at each planned location
    - Sticky cards or other traps
    - Upper and lower leaves of selected plants
    - Roots

Think in 3 dimensions

- Where might pests come in?
- Don’t forget to look up – depending on your c
- Weeds under benches
- Floors, water sources, ventilation



Jackson


Always look for pests on “pet plants”


Check outdoor weeds?


Inspect incoming plant materials

Know what to expect each season

- Spring (for example)
  - Fungus gnats/shore flies
  - Thrips on plugs/cuttings
  - Broad mites
  - Aphids
  - Spider mites
  - Whiteflies

- **Which crops are most likely the first place to find each pest?**
- **What is typical pest behavior – dispersal, rate of increase, reaction to environment….**

What are your go to crops for scouting for particular pests?

Use sticky traps to check for pests that might emerge from the soil

What information is important and how are you going to record it?

- Depend on what the grower wants to know – if you are working for someone else
- It's easier to do if it is organized the way your mind works

- Gather more information than you think you might need

- Create a scouting form….

Greenhouse IPM Scouting

House								
Date		CROP	WF	Thrips	F.G.	Aphids	S.F.	Other
House								
Date		CROP	WF	Thrips	F.G.	Aphids	S.F.	Other
House								
Date		CROP	WF	Thrips	F.G.	Aphids	S.F.	Other

House								
Date		CROP	WF	Thrips	F.G.	Aphids	S.F.	Other
House								
Date		CROP	WF	Thrips	F.G.	Aphids	S.F.	Other
House								
Date		CROP	WF	Thrips	F.G.	Aphids	S.F.	Other

When

Where

How many

Codes

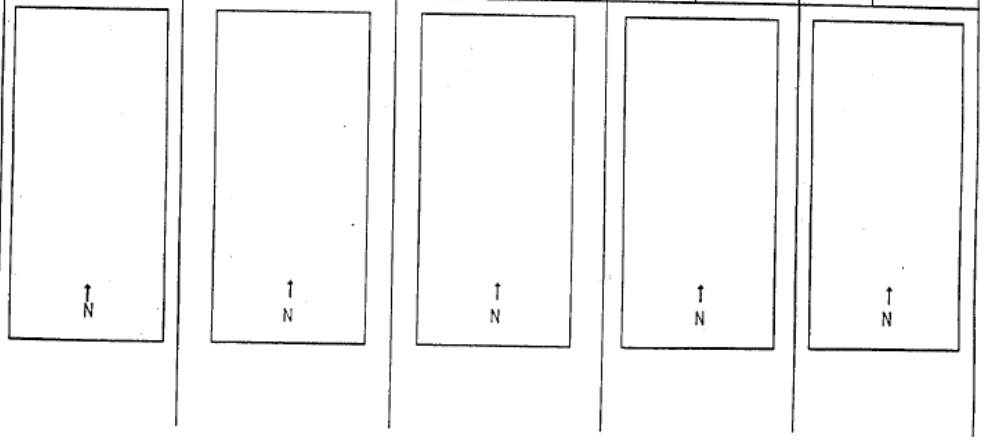
Mapping

PLANT PEST SCOUTING REPORT GREENHOUSE #_____ MONTH OF _____, 19____

PEST ENCOUNTERED	WEEK #1___ LOCAL	GENERAL	WEEK #2___ LOCAL	GENERAL	WEEK #3___ LOCAL	GENERAL	WEEK #4___ LOCAL	GENERAL	WEEK #5___ LOCAL	GENERAL
Aphids										
Beneficials										
Caterpillars										
Fungus Gnats										
Pathogens										
Scales										
Spider Mites										
Thrips										
Whiteflies										
Other										

0= NONE FOUND
3= LIGHT POPULATION
6= MODERATE POPULATION
10=HEAVY POPULATION

INDICATE LOCAL POPULATIONS ON MAPS. LIST PROBLEMATIC PLANTS BELOW. ABBREVIATE W/THE MODEL AS EXAMPLE.



IPM Monitoring Form

Date	Nursery	Time In	Time Out	Total	IPM Specialist

Comments:

Block	Host Plant	Size	Stage	Pest	Stage	Damage Site	Damage Level	Abundance	Natural Enemies	Control Action	Comments & Recommendations	Material	Date Applied	Evaluation

Key to Codes:

Host Plant Size:
<1ft seedling = 1
1-3ft tall = 2
3-6ft tall = 3
6-8ft tall = 4
>8ft tall = 5

Host Plant Stage:
seedling = 2
budding = 3
flowering = 4
fruiting = 8
leafing out = 9
mature = 10
dormant = 11

Pest Stage:
egg = 1
early instar = 2
late instar = 3
pupa = 4
adult = 5
past damage = 6

Damage Site:
bark = 1
bud = 2
flower = 3
fruit = 4
foliage = 5
miner = 6
borer = 7
roots = 8
dieback = 9

Damage Level:
none (0%) = 0
trace (<5%) = 1
light (5-10%) = 2
moderate (10-30%) = 3
heavy (30-90%) = 4
total damage (100%) = 5

Abundance:
rare (<5%) = 1
few (5-20%) = 2
common (20-50%) = 3
abundant (50-90%) = 4
extreme (100%) = 5

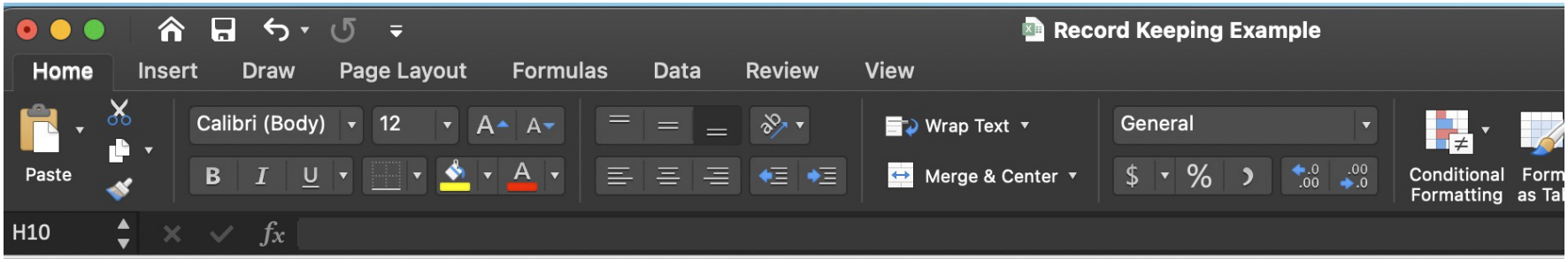
Natural Enemies:
rare = 1
few = 2
common = 3
abundant = 4

Action Recommendation:
no action = 1
mechanical = 2
cultural = 3
biological = 4
chemical = 5

Much more plant information

Also includes beneficials

Place for recommendation



	A	B	C	D	E	F	G	H	I	J	K	L
1	**Sticky Card Count**	**Week 1**	**Week 2**	**Week 3**	**Week 4**	**Week 5**	**Week 6**					
2	Adult Whiteflies	0	2	1	1	0	2					
3	Fungus Gnats	0	4	8	10	4	2					
4	Western Flower Thrips	3	12	25	11	3	3					
5	Winged Aphids	0	0	0	0	0	0					
6	Shore Flies	1	3	2	1	0	1					
7												

Let your staff suggest ways to gather the information

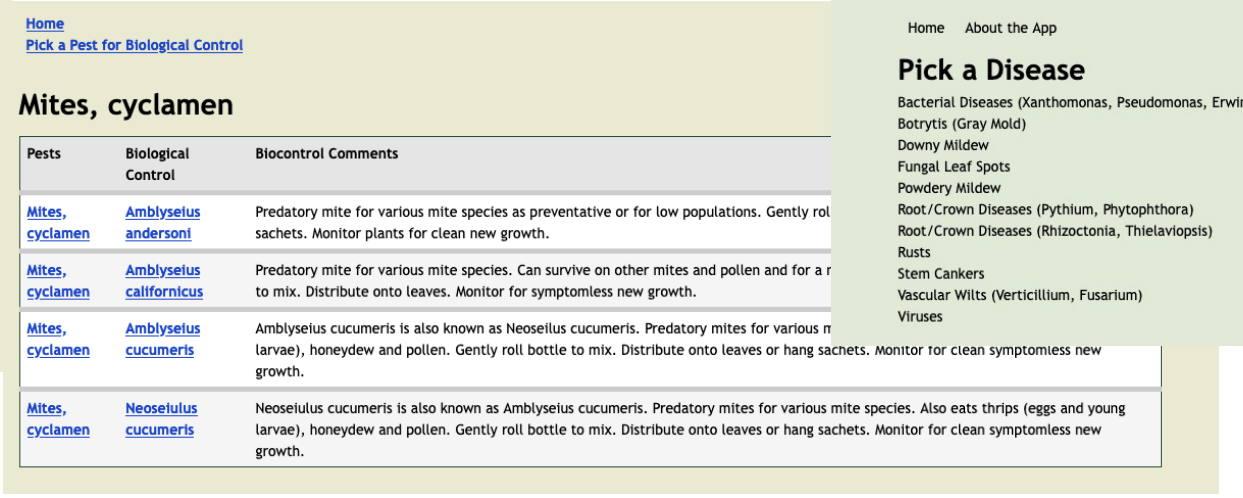
Kuki Haines

Apps for scouting, ID and management

- Management options
- Plant sample diagnosis
- Interactive apps
- Sticky card reading

Management options

- UMass Greenhouse Pest Guide and Greenhouse Disease Guide – management options



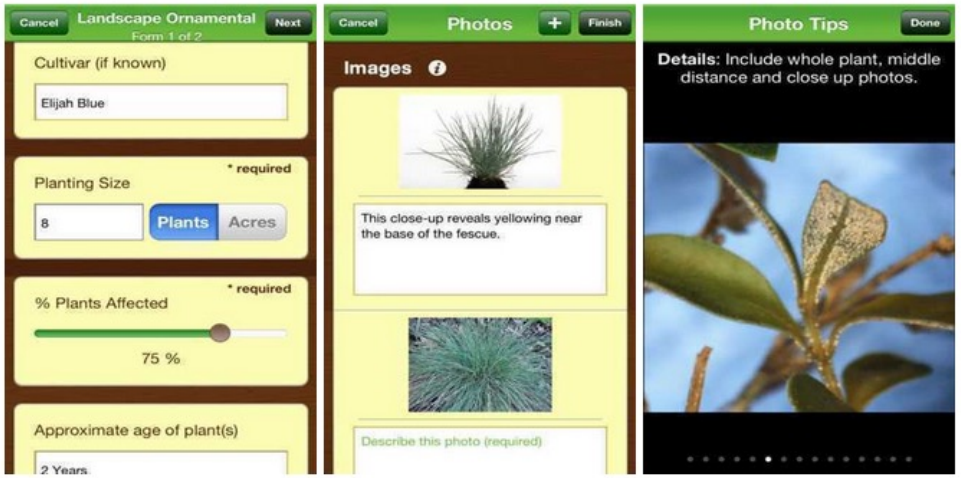
Plant sample diagnosis

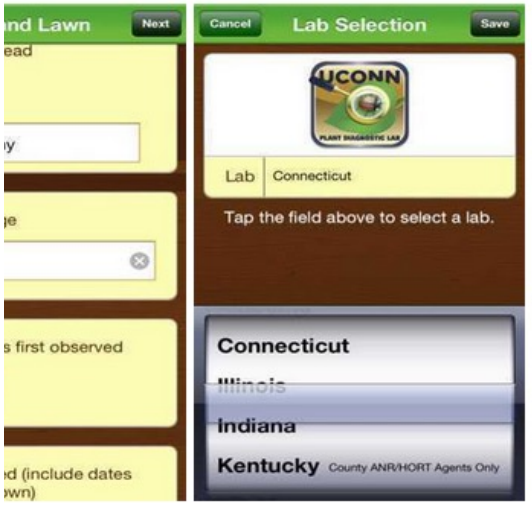
Plant Diagnostic Sample Submission

Developed by: Incubed
Countries: Canada,US
Languages: English

☆☆☆☆☆

Add to favourite | FREE Go to Store | Send to email





Interactive apps

- GreenhouseScout – in progress
- IPM Scoutek
- Koppert

- **Has anyone tried these?**

Greenhouse Scout

Español

Admin ▾ Menu ▾

menu

Melon Aphid

Aphis gossypi

Download Fact Sheet

Beneficials

- Aphidoletes
- Colemani
- Lady Bugs, Lady Beetles

Symptoms and Damage

Symptom #2

- Suck plant sap from phloem
- Presence reduces quality
- Honeydew promotes growth of sooty mold
- May prefer certain species or varieties

Identification

Nymph (4 instars) – looks like adult but smaller

Adult

- No indentation on head
- Antennae shorter than body
- Cornicles dark, no matter what is the body color
- Smaller than green peach aphid

Monitoring

Monitoring #1

Description goes here...

Common Hosts

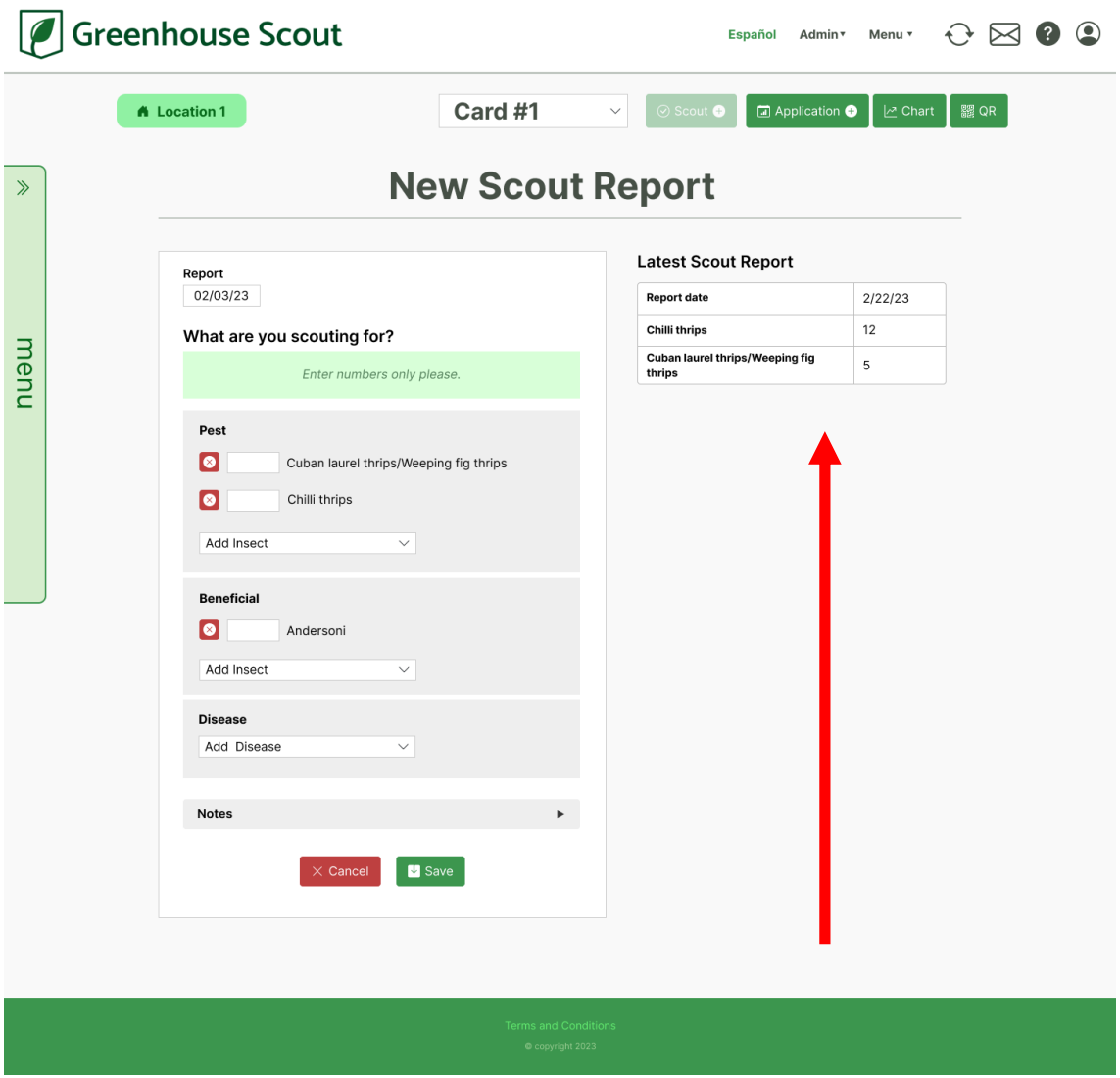
Integer in purus eu dui sagittis sodales. Donec at urna erat. Maecenas placerat tortor nulla, quis accumsan massa pretium ut. Integer non tellus neque. Cras fringilla diam auctor hendrerit hendrerit. Donec consectetur ipsum urna, ultrices elementum arcu vulputate et. Donec finibus ultricies est, et .

Lifestages

ultrices lacus ullamcorper a. Duis varius lectus metus, eu accumsan mi vulputate ut. Suspendisse potenti. Vivamus at risus lectus. Duis commodo risus nec tristique elementum. Vestibulum non interdum libero, id bibendum felis. Aliquam varius tellus vel tempus vestibulum

Optimal Conditions for Development

Integer in purus eu dui sagittis sodales. Donec at urna erat. Maecenas placerat tortor nulla, quis accumsan massa pretium ut. Integer non tellus neque. Cras fringilla diam auctor hendrerit hendrerit. Donec consectetur ipsum urna, ultrices elementum arcu vulputate et. Donec finibus ultricies est, et .


Greenhouse Scout
Español
Admin
Menu
Location 1
Card #1
Scout
Application
Chart
QR
menu
New Scout Report
Report
02/03/23
What are you scouting for?
Enter numbers only please.
Pest
Cuban laurel thrips/Weeping fig thrips
Chilli thrips
Add Insect
Beneficial
Andersoni
Add Insect
Disease
Add Disease
Notes
Cancel
Save
Latest Scout Report
Report date 2/22/23
Chilli thrips 12
Cuban laurel thrips/Weeping fig thrips 5
Terms and Conditions
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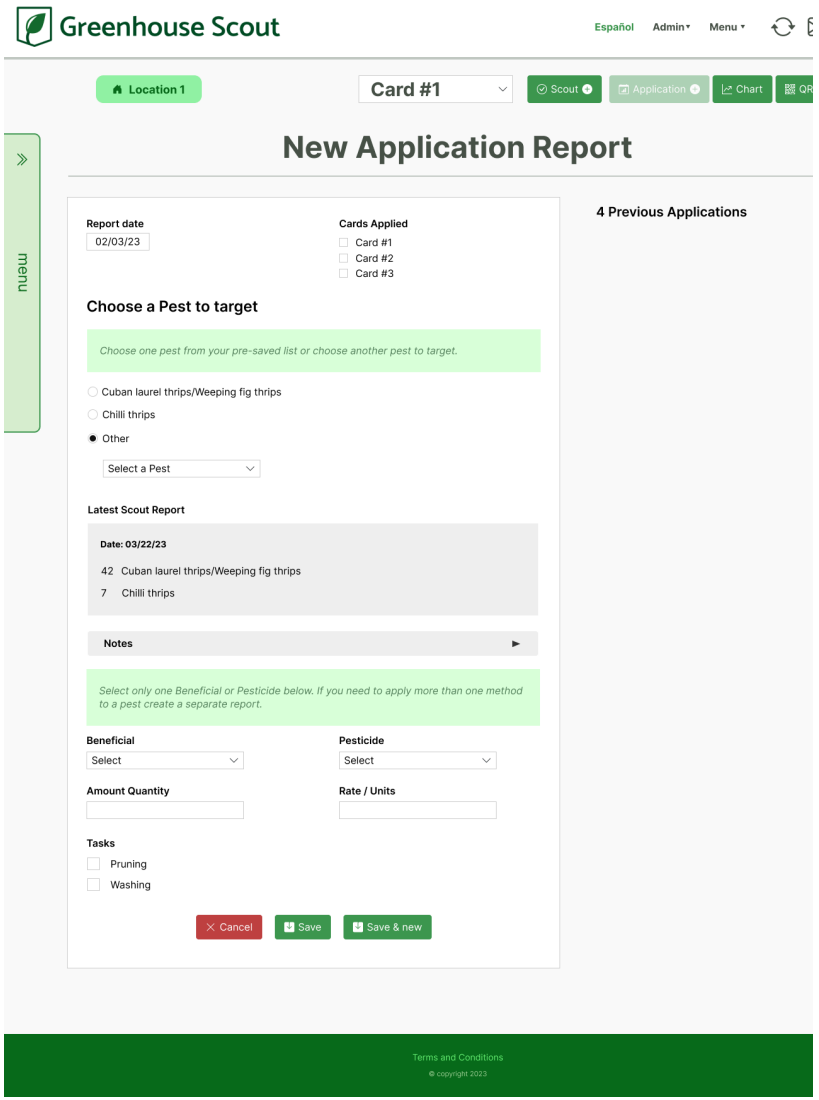

Greenhouse Scout
Español
Admin
Menu
Location 1
Card #1
Scout
Application
Chart
menu
New Application Report
Report date
02/03/23
Cards Applied
Card #1
Card #2
Card #3
4 Previous Applications
Choose a Pest to target
Choose one pest from your pre-saved list or choose another pest to target.
Cuban laurel thrips/Weeping fig thrips
Chilli thrips
Other
Select a Pest
Latest Scout Report
Date: 03/22/23
42 Cuban laurel thrips/Weeping fig thrips
7 Chilli thrips
Notes
Select only one Beneficial or Pesticide below. If you need to apply more than one method to a pest create a separate report.
Beneficial
Select
Pesticide
Select
Amount Quantity
Rate / Units
Tasks
Pruning
Washing
Cancel
Save
Save & new
Terms and Conditions
© copyright 2023

Greenhouse Scout

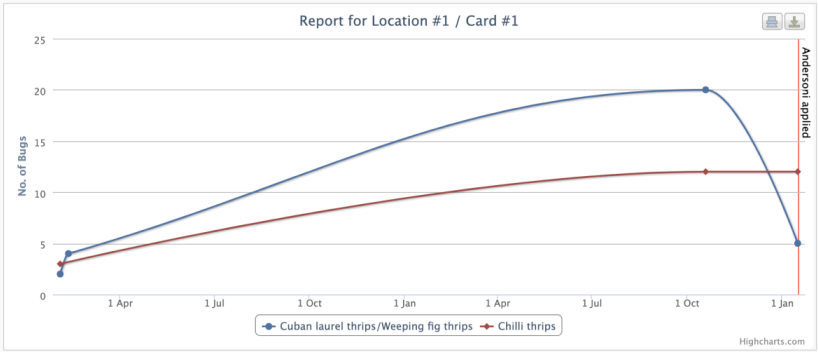
Español Admin Menu

Location 1 | Card #1 | Scout | Application | Chart | QR

menu

Chart

Showing reports from **03/23/2023** to **04/23/2023**



Date	Description	Actions
01/15/23	Andersoni applied: 500	
10/29/22	Chilli thrips: 12 Cuban laurel thrips/Weeping fig thrips: 5	
02/03/21	Chilli thrips: 12 Cuban laurel thrips/Weeping fig thrips: 20	

Filters

1 Month

Start date 3/23/23

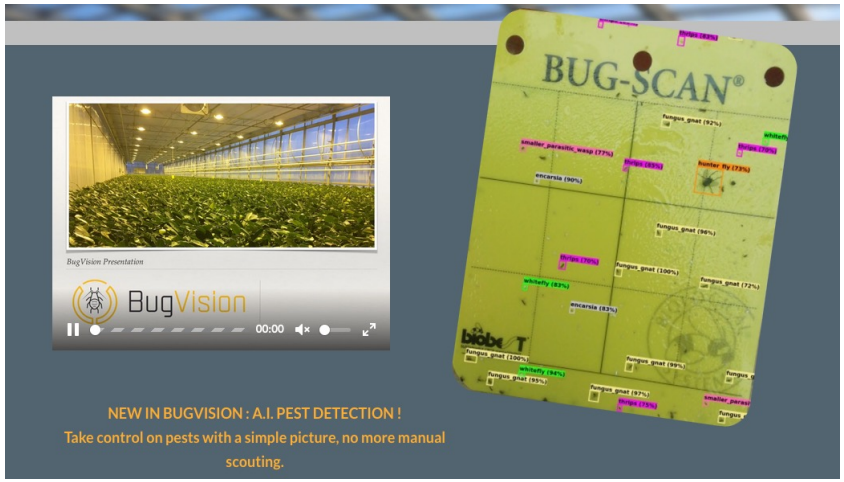
End date 4/23/23

Scouted Pests/Beneficials

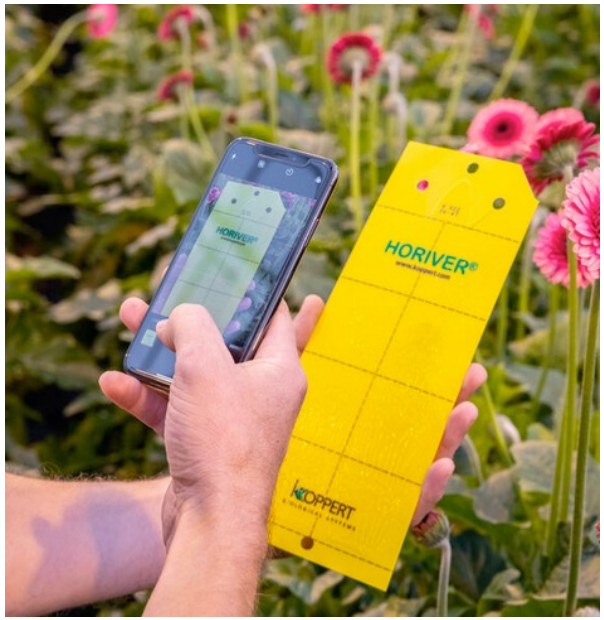
- Cuban laurel thrips/Weeping fig thrips
- Chilli thrips

Apply | Reset

Sticky card reading



BugVision



Koppert Natutec – whiteflies only

Has anyone tried these?

Scouting for disease organisms

- Types of symptoms
  - Damping off
  - Wilting
  - Brown or stringy roots
  - Uneven stand
  - Stunting
  - Yellowing
  - Stem cankers
  - Water soaked lesions
  - Mycelium or fruiting bodies on foliage or stems
  - Defoliation
  - Presence of overwintering structures
  - Leaf distortion
  - Color patterns
  - Galls

Getting from scouting to ID takes practice

- Different species may have different symptoms from the same disease
- Abiotic issues may mimic disease or insect damage
- Keep track of which hosts get which diseases

- **The benefits of training!**

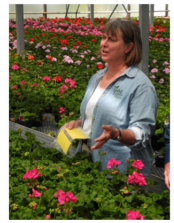
Photo compliments of Sandra Jensen

What is the most useful thing you have ever found to help you scout?

Greenhouse Scout School

- February – March 2024
- 6 weeks
- On-line
  - Can be asynchronous
- Certificate program
  - Additional information
  - Access to recordings
  - Equipment
  - Hands-on activities
- Webinar series
- Pesticide recertification credits

Cheryl
cfrank@uvm.edu



Questions ?

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Thanks! Any questions?