Scouting for Vegetable and Fruit Pests on Organic Farms

Helen Atthowe and Doug O'Brien

April 25, 2013

http://www.extension.org/organic_production

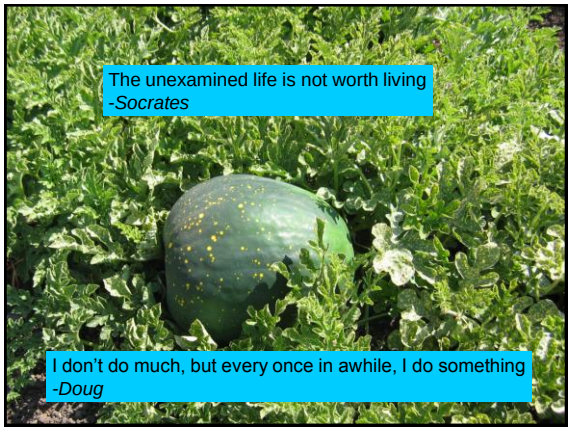
Helen Atthowe

Doug O'Brien

Assessing Vegetable Crops.

Doug O'Brien Agricultural Consulting

'How to look.'
not
'What to do when you find.'


The unexamined life is not worth living
-Socrates
I don't do much, but every once in awhile, I do something
-Doug


Complexity = no multi-tasking


Wherever you are, be there

Some tips for being there…

- Concentrate – just you and the vegetable
- Expect the unexpected –
- Expect the expected - Many things occur in cycles and knowing the cycles can help direct your observations

Techniques

Keep records

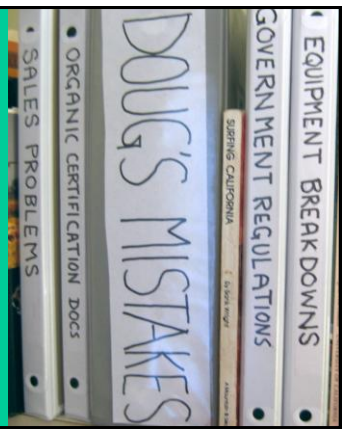
Use objective criteria – put a number to it:
10/20 plants or 50% of plants have aphids.
light=keep an eye on it. Heavy=trouble.
"Increasing" and/or "decreasing" always useful.

- Objective vs subjective
- Statistical sample
- Evenness of distribution - inspect regularly, vary the spot.

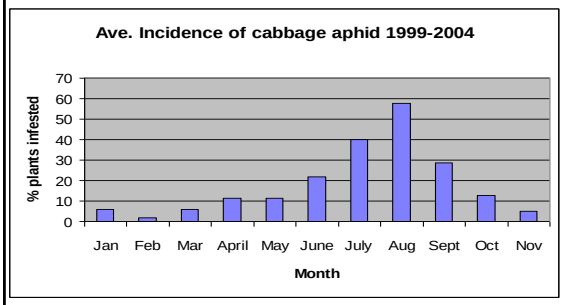
Observe from different distances
- Look far.
- Look medium.
- Look close.
- Repeat

Keep records

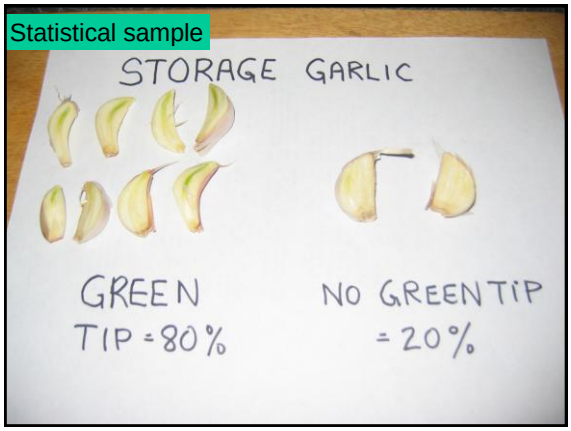
In organic farming not learning from mistakes, doomed to repeat them.



Use objective criteria



Statistical sample



Look at enough to be reasonably sure its representative of the whole group. If you sample 5 plants, you have a 20% chance of missing something. 50 plants gives a 2% error.

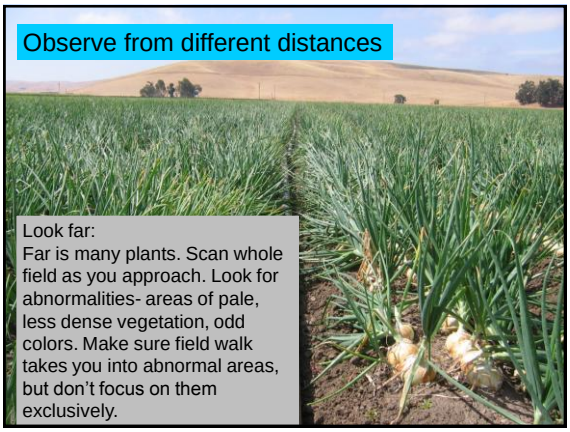
How many plants to look at? Usually 5 to 10.

Using objective criteria and statistical samples means you can develop thresholds- levels that trigger some action. Threshold varies with the field and time of year.

Ie., ICW: In cabbage, don't do anything if <20% and its not June. In broccoli, 5% and not June. Doing actual counts forces you to pay attention.

'Evenness of distribution'

Observe from different distances



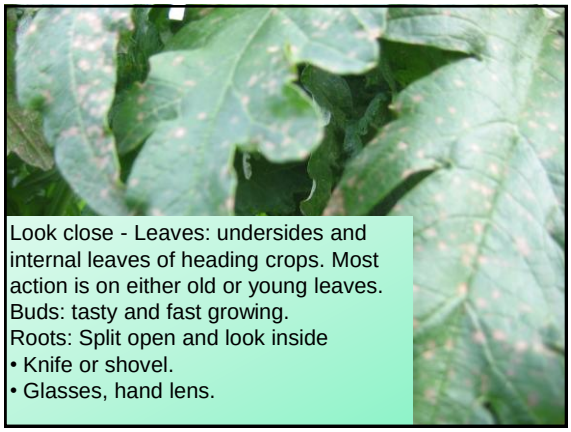
Look far:
Far is many plants. Scan whole field as you approach. Look for abnormalities- areas of pale, less dense vegetation, odd colors. Make sure field walk takes you into abnormal areas, but don't focus on them exclusively.

- Where to enter field - Vary field entry spots.
- When - High noon best- shadows, low light.
- How often - Match frequency of observation to soil temp.

Everything happens faster when warm.

- In winter 1 or 2/wk. In midsummer, can't scout often enough.
- Cutting corners

Look Near - what you see looking down when standing up.
• Which plants
• Walking pattern and How far into field - Best = diagonal or an X.
Usually: look at some edge plants, some plants 20' in, down and across rows. Sometimes: walk to center, down 1 row, over a few rows and back.



Look close - Leaves: undersides and internal leaves of heading crops. Most action is on either old or young leaves.
Buds: tasty and fast growing.
Roots: Split open and look inside
• Knife or shovel.
• Glasses, hand lens.

Example of sampling for estimating aphid infestation. 20 half heads.

Barriers

WHY SCOUT? BETTER DECISION-MAKING!
Sample: 1-10 leaves on 10 plants.
Calculate # of pests & predators per leaf.

More plants when trying to FIND problem, less when monitoring already known problem.

DECISION-MAKING BASED ON YOUR FARM'S PEST THRESHOLDS

Number/amount of pests/injury per plant or leaf resulting in "economic damage".

Threshold Examples:

Cabbage: 35% plants with >1 worm at heading (U Minn).
5 worms per 20 plants: 25% (Doug).

B. sprouts: >1 worm/25 plants at sprout formation: 25% (PNW).

Broccoli: 20% leaves with 1 worm at button stage (OSU).
2 worms per 20 plants: 10% (Doug).

Cabbage worms

Thresholds and Degree Day Models

See your state's Extension IPM personnel for local economic (action) thresholds for specific pests.

- **Fruit Crop Pest Models:**

WSU http://das.wsu.edu

- **Vegetable Crop Pest Models:**

http://uspest.org/wea

Pacific Northwest: http://uspest.org/pnw/insects

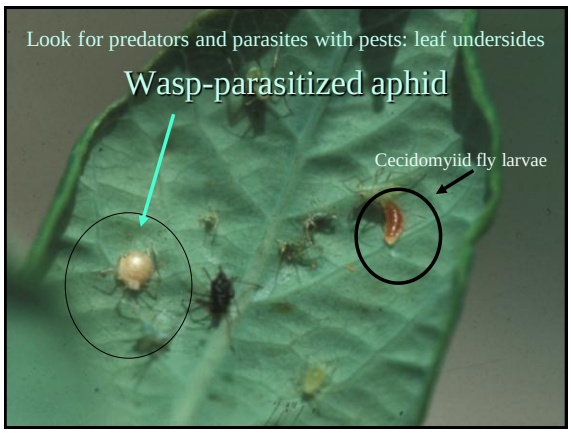
Cornell: http://ipmguidelines.org/VegCrops

THRESHOLD LEVEL INCLUDES NUMBER OF PREDATORS.

Monitor Predators:

Aphids:
1 predator/10 pests or parasitism rate:
1 parasitized to 2 not parasitized.

Many good "ratio models" available for predatory mites.



Example 1: ONION THRIP THRESHOLD

- 30 thrips/plant.
- 15-30 thrips/plant for thrips susceptible varieties.

Relative susceptibility of onion varieties to thrips injury:
(data from CSU 1991-1993 & OSU 2007/2009)
***Highly tolerant** : White Keeper, Super Star.*
***Moderately tolerant**: Zapotec, Vega, El Charro, Snow White, X 201, Legend, Granero.*
***Susceptible**: Colorado 6, Valdez Brown Beauty, Brown Beauty 20, Sweet Perfection, White Delite, Tango, Blanco Duro, Copra.*
***Highly susceptible**: Early Red Stockton, Redman Mambo, Red Baron, Highlander.*

Research looking at thrips, virus & yield suggests these thresholds should be lower:

Evaluation of Onion Cultivars for Resistance to Onion Thrips and Iris Yellow Spot Virus. (MONTANO et al. 2010)

Example 2: Western Flower Thrips Farm Threshold

Woodleaf Farm Threshold for Peaches:

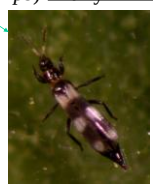
10 branches (1 branch/10 trees = approx. 100 leaves)
Calculate: thrips per leaf

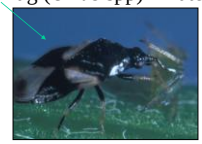
1 thrip/leaf = economic threshold for Woodleaf Farm

Predator adjustment: No Treatment if pest:prey ratio of 2:1

THRIP PREDATOR COMPLEX

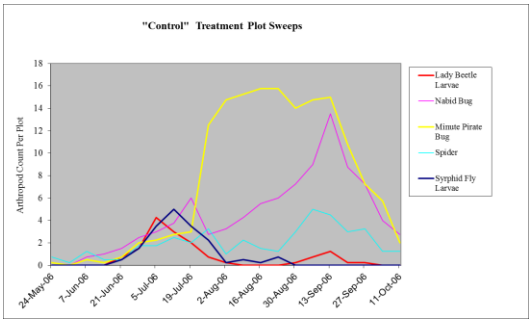
- Lady beetle (*Stethorus* spp.) – Early - Mid
- Syrphid fly (some species) - Mid - Late
- Cecidomyiid fly (*Aphidoletetes* spp.)- M-L
- Predatory thrips (*Scolothrips* & *Aelothrips*)
- Lacewing – Mid - Late
- Spiders –Early – Late
- Minute Pirate Bug (*Orius* spp) – Late
- Big-eyed Bug
- Ants
- Earwigs





Photos by Jack Kelly Clark, courtesy of University of California

Seasonal Peaks of Predator Complex in MT (2006)



Example 3: FLEA BEETLE SCOUTING

Flea beetle life cycle. (Photos by Ken Gray, courtesy of Oregon State University)

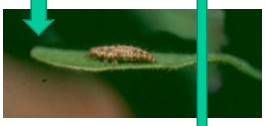
Fleas Beetles: Multiple generations & warmer temperatures = more flea beetle generations

WHEN TO MONITOR? When plant susceptible crops.

THRESHOLD LEVEL?

Cornell: one beetle per plant at cotyledon or seedling stage

Generalist predators such as lacewing larvae, big eyed bugs and damsel bugs



FLEA BEETLE PREDATORS:

carabid beetle

Photos by Jack Kelly Clark, courtesy of University of California

FLEA BEETLE PREDATORS: SPIDERS

Final Note - Monitor Weeds:

1 M^2 measure & estimate percent cover and note dominant species

LOOK REGULARLY & KEEP CONSISTENT RECORDS.

Find the slides and recording of this presentation at http://www.extension.org/pages/67843

Register for upcoming webinars and view recorded eOrganic webinars at http://www.extension.org/pages/25242

Additional organic farming questions? Ask them at https://ask.extension.org/groups/1668

We need your feedback! Please fill out our follow-up email survey!