Integrated Pest Management

Managing Pests Strategically on a Certified Organic Vegetable Farm

Cassie Pierce

Peace of Prairie Organic Farm

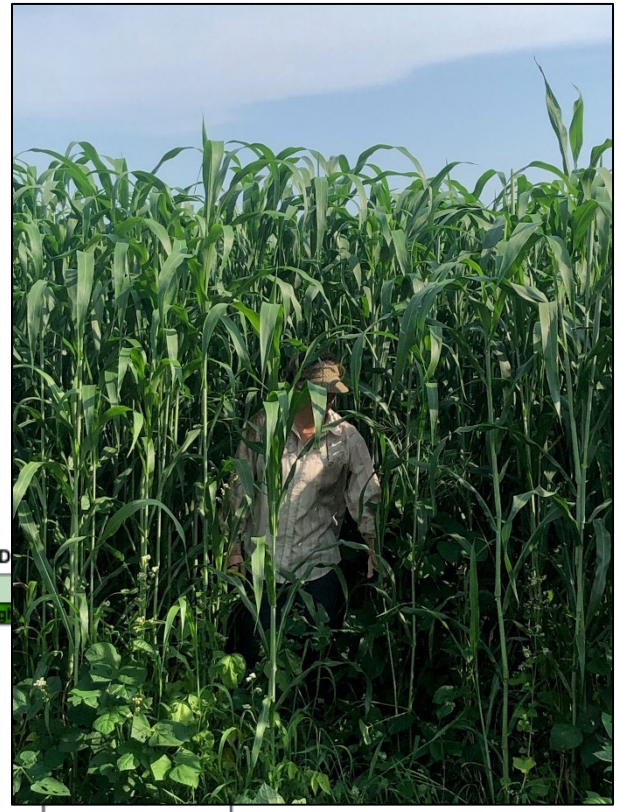
Muskogee, OK

Practices For Overall Pest Reduction

- Healthy soil
- Healthy plants
- Crop rotation
- Healthy farm ecosystem with lots of “not-pests”

Healthy soil

- Alive, rich in organic matter
- Nutrient-balanced, especially:
  - Enough calcium
  - Enough potassium
  - NOT too much nitrogen!



Lab No: 56009 **Field:** **Sample ID**

Test	Method	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / Very High)
Soil pH	1:1	7.3	
Buffer pH			
Phosphorus (P)	M3	58 ppm	
Potassium (K)	M3	54 ppm	
Calcium (Ca)	M3	1498 ppm	
Magnesium (Mg)	M3	157 ppm	
Sulfur (S)	M3	35 ppm	
Boron (B)	M3	0.9 ppm	
Copper (Cu)	M3	3.7 ppm	
Iron (Fe)	M3	259 ppm	
Manganese (Mn)	M3	76 ppm	
Zinc (Zn)	M3	9.4 ppm	
Sodium (Na)	M3	116 ppm	
Soluble Salts	SS1:2	0.3 dS/m	
Organic Matter	LOI	2.2%	
Estimated N Release		88 lbs/acre	
Nitrate Nitrogen	Soil NO3	8 ppm	

Na	5.4	0.5
K/Mg Ratio:	0.10	
Ca/Mg Ratio:	5.73	

SOIL FERTILITY GUIDELINES

Crop : Garden **Yield Goal :** 1 Optimum **Rec Units:** LB/1000 SF

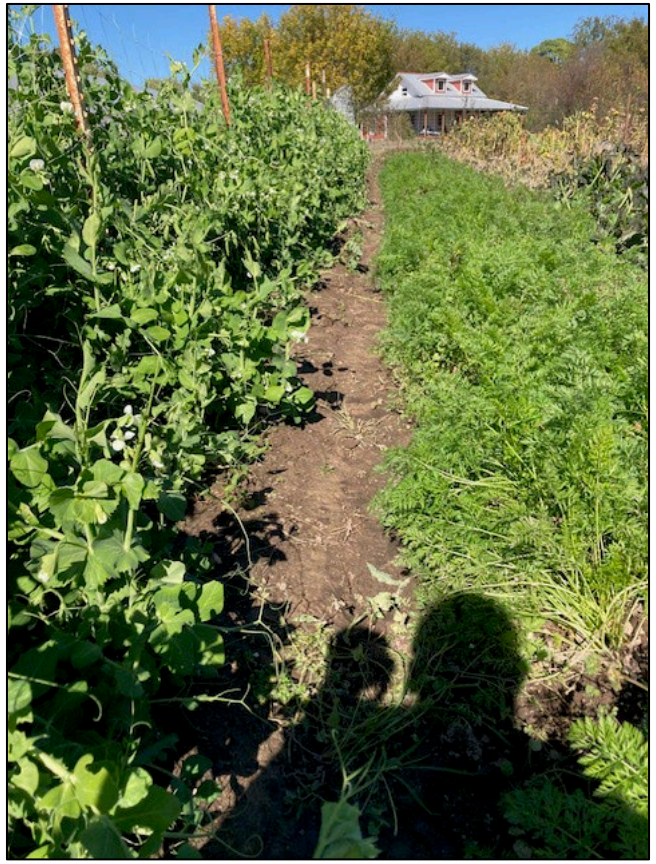
(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
0	3.0	1.0	4.0	0	0	0	0	0	0	

Crop : **Rec Units:**

Healthy Plants

- Healthy soil
- Spacing
- Moisture
- Right season
- Right varieties

Crop rotation



Practices For Overall Pest Reduction

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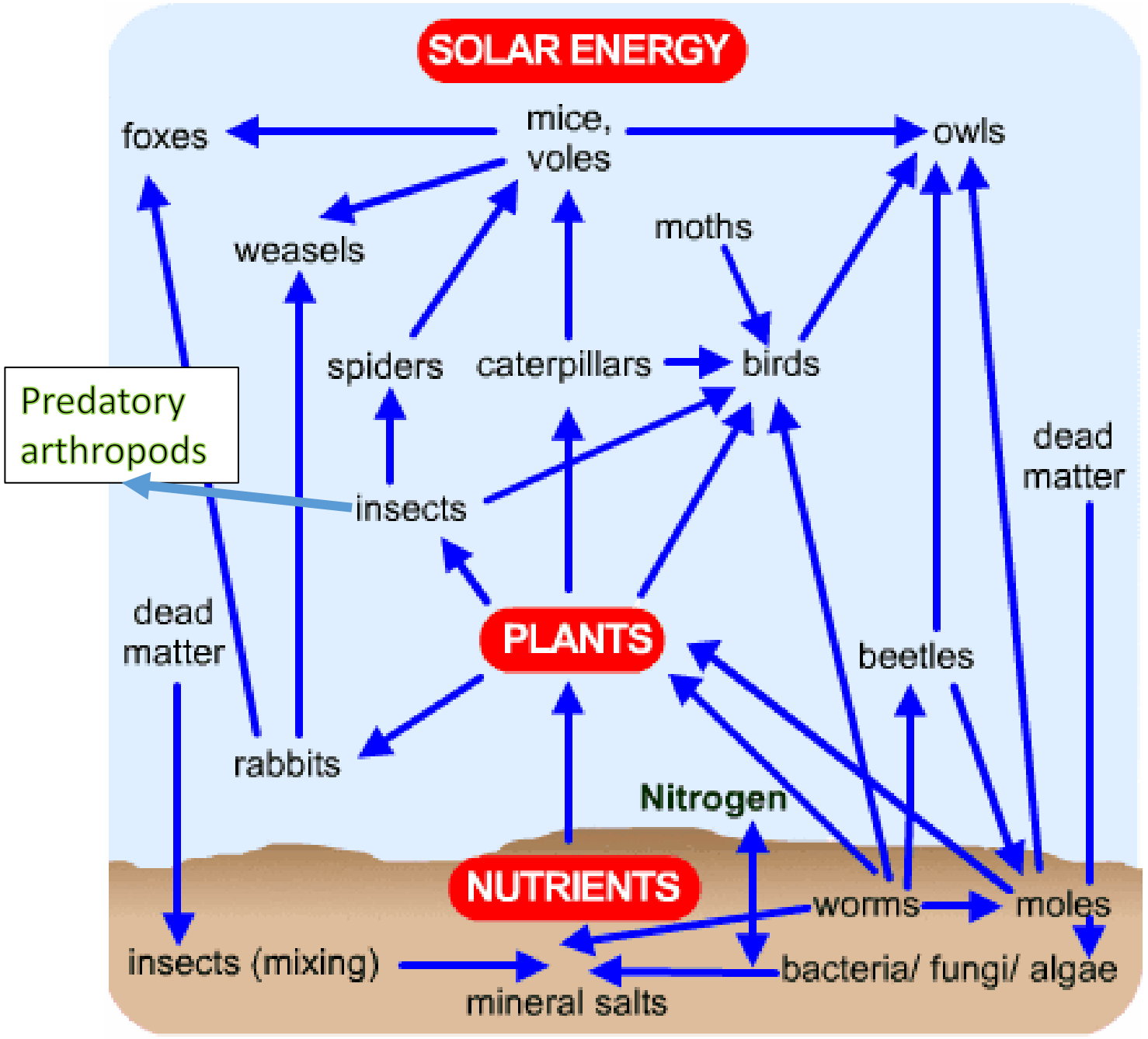
- Healthy plants
- Crop rotation
- Healthy farm ecosystem with lots of “not-pests”


SOLAR ENERGY
foxes
mice, voles
owls
weasels
moths
spiders
caterpillars
birds
Predatory arthropods
insects
dead matter
dead matter
PLANTS
beetles
rabbits
Nitrogen
NUTRIENTS
worms
moles
insects (mixing)
bacteria/ fungi/ algae
mineral salts

Examples of predatory arthropods

- Predatory ground beetles: hundreds of species
- Lady beetles
- Rove beetles
- Soldier beetles
- Lacewings
- Damsel bugs
- Big-eyed bugs

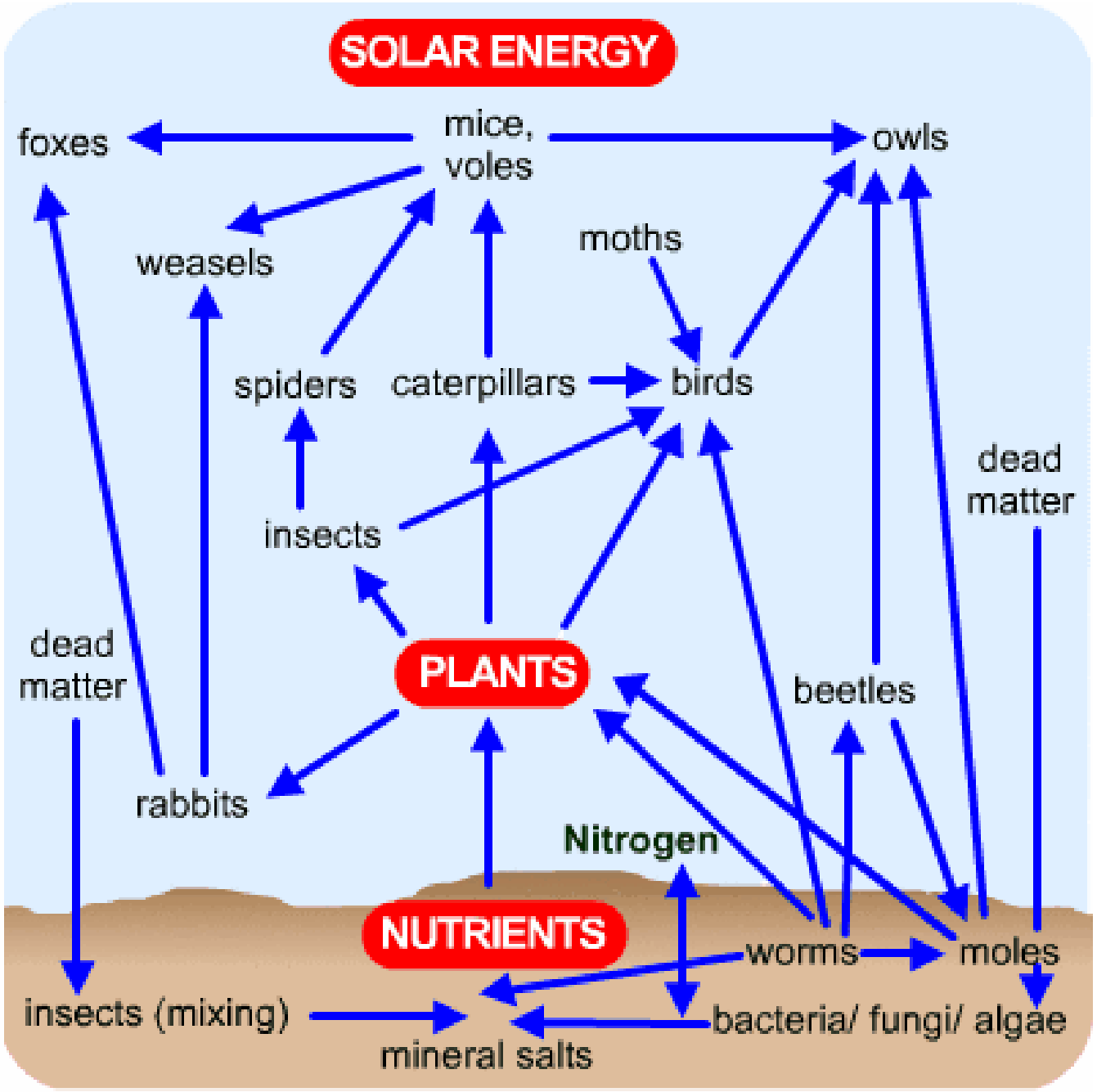
- Pirate bugs
- Assassin bugs
- Predatory wasps
- Parasitoid wasps
- Parasitic flies
- Spiders
- Harvestmen
- Predatory mites

**Most of these are families with hundreds or thousands of species!

Examples of predators

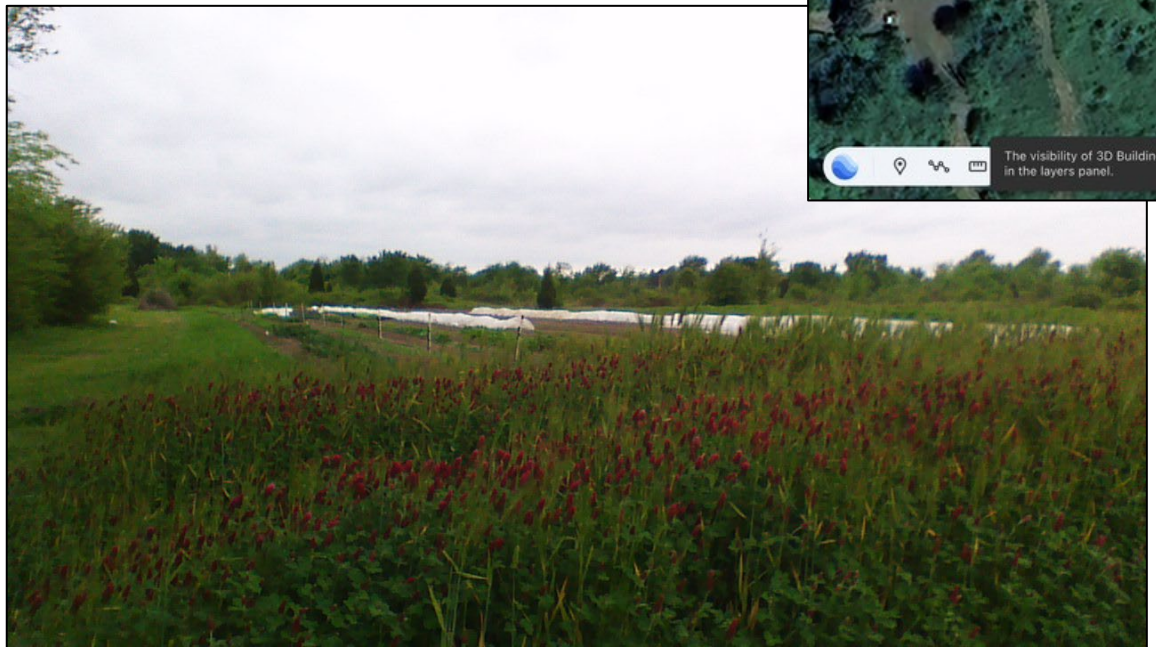
Examples of predators

Also consider all the “not-pests”!



How to have a healthy farm ecosystem?

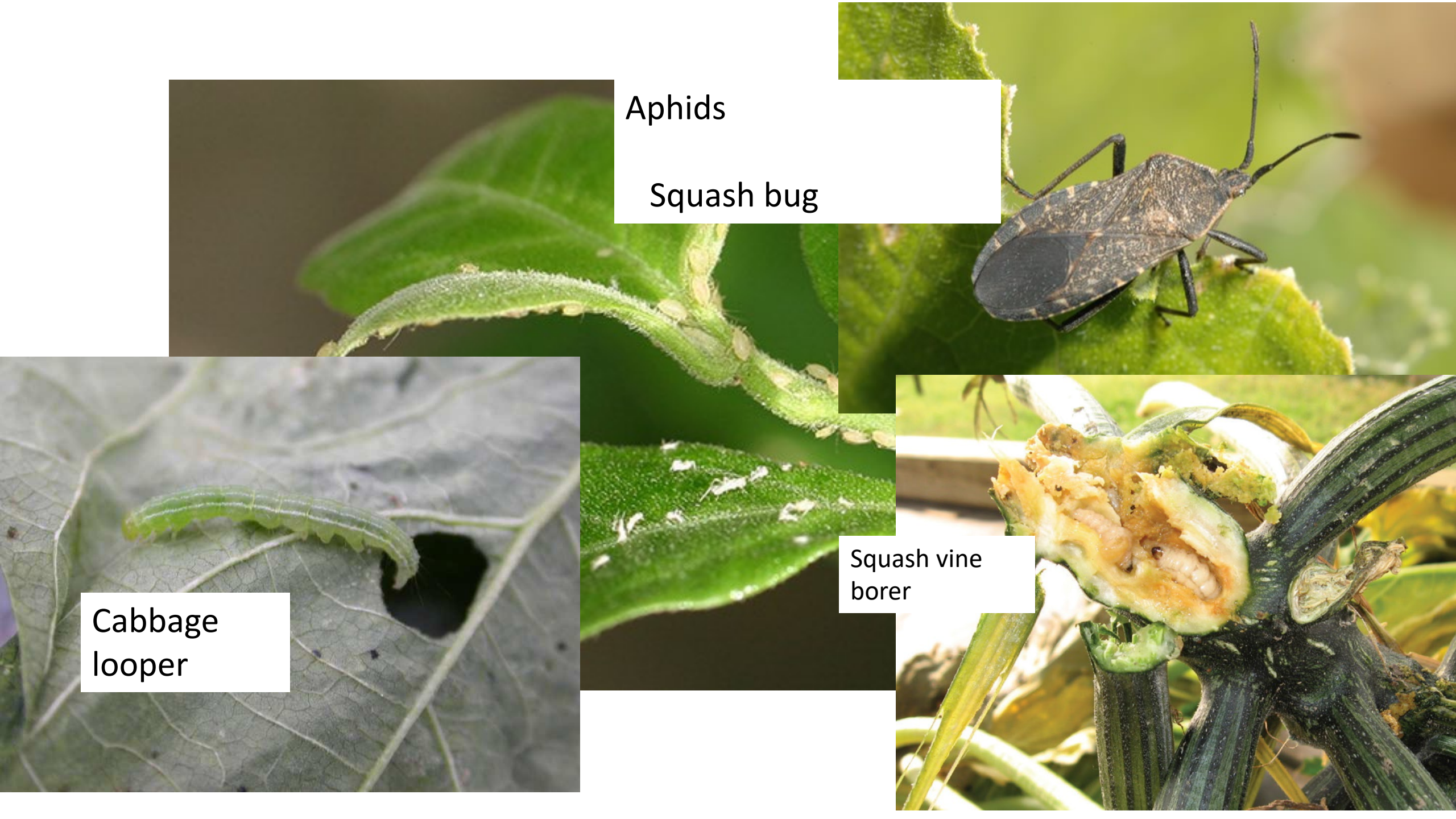
- No pesticides, or very strategic use
- Habitat
  - Unmowed vegetation
  - Year-round
  - Variety of host plants
  - Doesn’t have to be fancy



Pests

- How many?

Pest	Crops	Control strategy
Aphids		
Cabbage looper		
Squash bugs		
Squash vine borer		
Blister beetles		
Spider mites		
Harlequin bug		
(Tobacco hornworm)		
(Flea beetles)		
(Pill bugs)		
(Thrips)		


Aphids
Squash bug
Cabbage looper
Squash vine borer

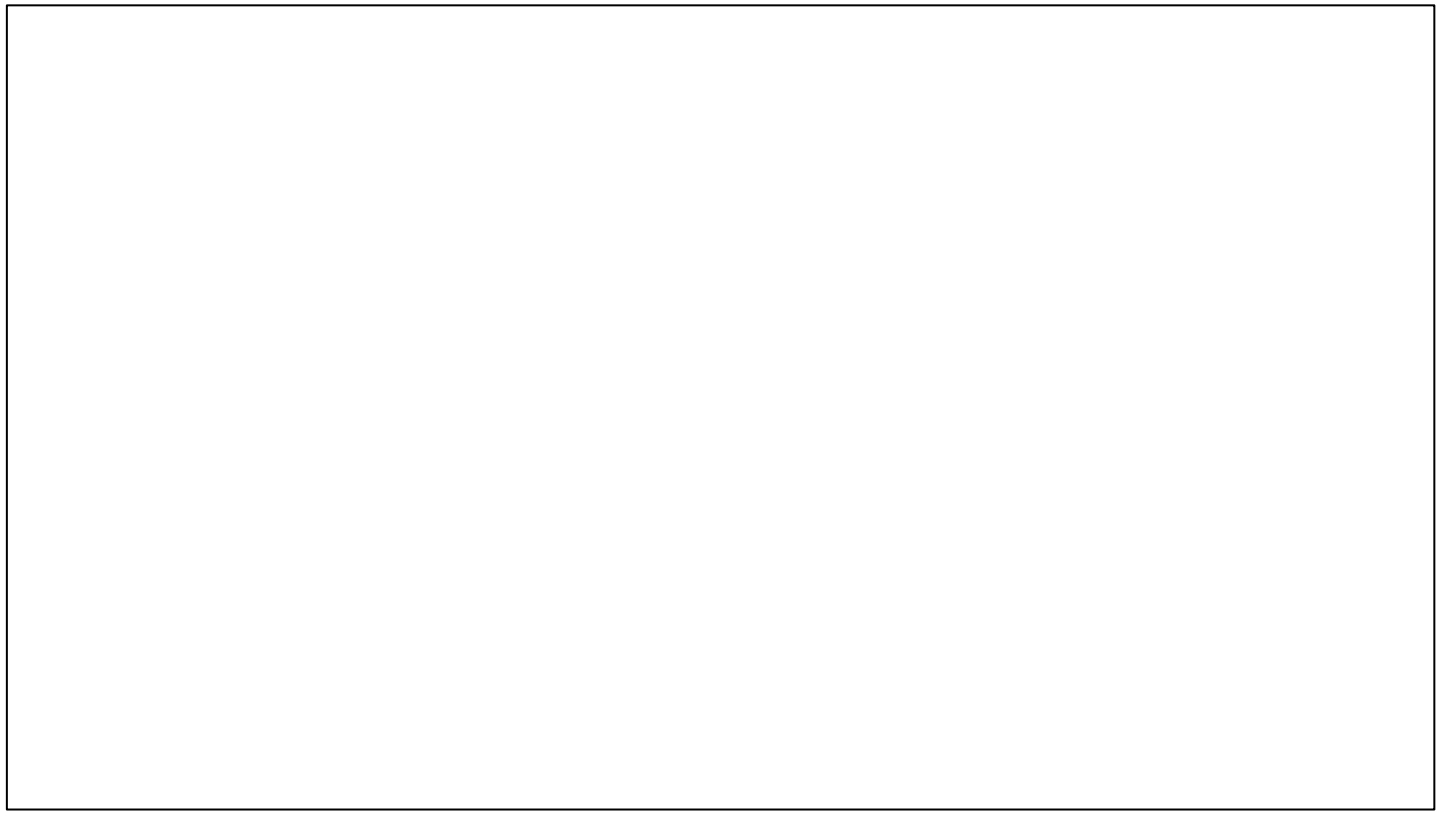
- Blister beetle
- Tobacco hornworm
- Spider mites
- Harlequin bugs

Pest	Crops	Control strategy
Aphids	Kale, brassicas, turnips, overwintered flowers, tomatoes and peppers in Spring, misc.	
Cabbage looper	Brassicas, lettuce	
Squash bugs	Summer and winter squash	
Squash vine borer	Summer and winter squash	
Blister beetles	Beets, tomatoes, Swiss chard, peppers, Celosia, misc.	
Spider mites	Tomatoes in Spring	
Harlequin bug	Kale and brassicas in Summer	
(Tobacco hornworm)	Tomatoes	
(Flea beetles)	Eggplant, kale	
(Pill bugs)	Tiny transplants in early Spring	
(Thrips)	Summer lettuce	

Pest	Crops	Control strategy
Aphids	Kale, brassicas, turnips, overwintered flowers, tomatoes and peppers in Spring, misc.	Strip infested bottom leaves; Preventative soap spray (every 7-10 days) –M-pede
Cabbage looper	Brassicas, lettuce	Hand-picking; Preventative (7-10 days) Bt spray (Dipel)
Squash bugs	Summer and winter squash	Replanting every 3 weeks; torch old crop
Squash vine borer	Summer and winter squash	Replanting every 3 weeks; torch old crop
Blister beetles	Beets, tomatoes, Swiss chard, peppers, Celosia, misc.	Stomp with a friend; Clover as a trap crop; Pyganic
Spider mites	Tomatoes in Spring	Water spray; hand strip web
Harlequin bug	Kale and brassicas in Summer	Don’t plant vulnerable plants in summer
(Tobacco hornworm)	Tomatoes	Handpick (flashlight at night)
(Flea beetles)	Eggplant, kale	Pyganic, row cover
(Pill bugs)	Tiny transplants in early Spring	Diatomaceous earth sprinkled

- Grasshoppers
- Rodents
- Summer: sorghum-sudangrass, cowpeas, mung beans, millet, sunflower
- Winter: winter rye, winter pea, hairy vetch

Organic pest control strategies that work:



Integrated Pest Management

- *“Integrated Pest Management (IPM) is a science-based, decision-making process that identifies and manages pests while minimizing risks to people and the environment.”*

Integrated Pest Management

1. Scouting: where to look?
   a) Identification
   b) Observation: what is actually the problem?
2. Action threshold
   a) Pest presence vs. infestation
   b) When is action worth the effort?

Integrated Pest Management

3. Action pyramid: least to most invasive/costly
    a) Prevention/cultural controls: usually low-effort, inexpensive, easy to systematize
    b) Physical controls:
    c) Biological controls:
    d) Chemical controls:
4. Evaluation and adjustment:
    a) “Not perfect, just better every year”

**Destroying plants and starting over with a new plan is often a valid option.

Thanks!

Cassie Pierce
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Muskogee, OK

Produce, cut flowers, and Spring plant starts

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