Tropical Fruit IPM

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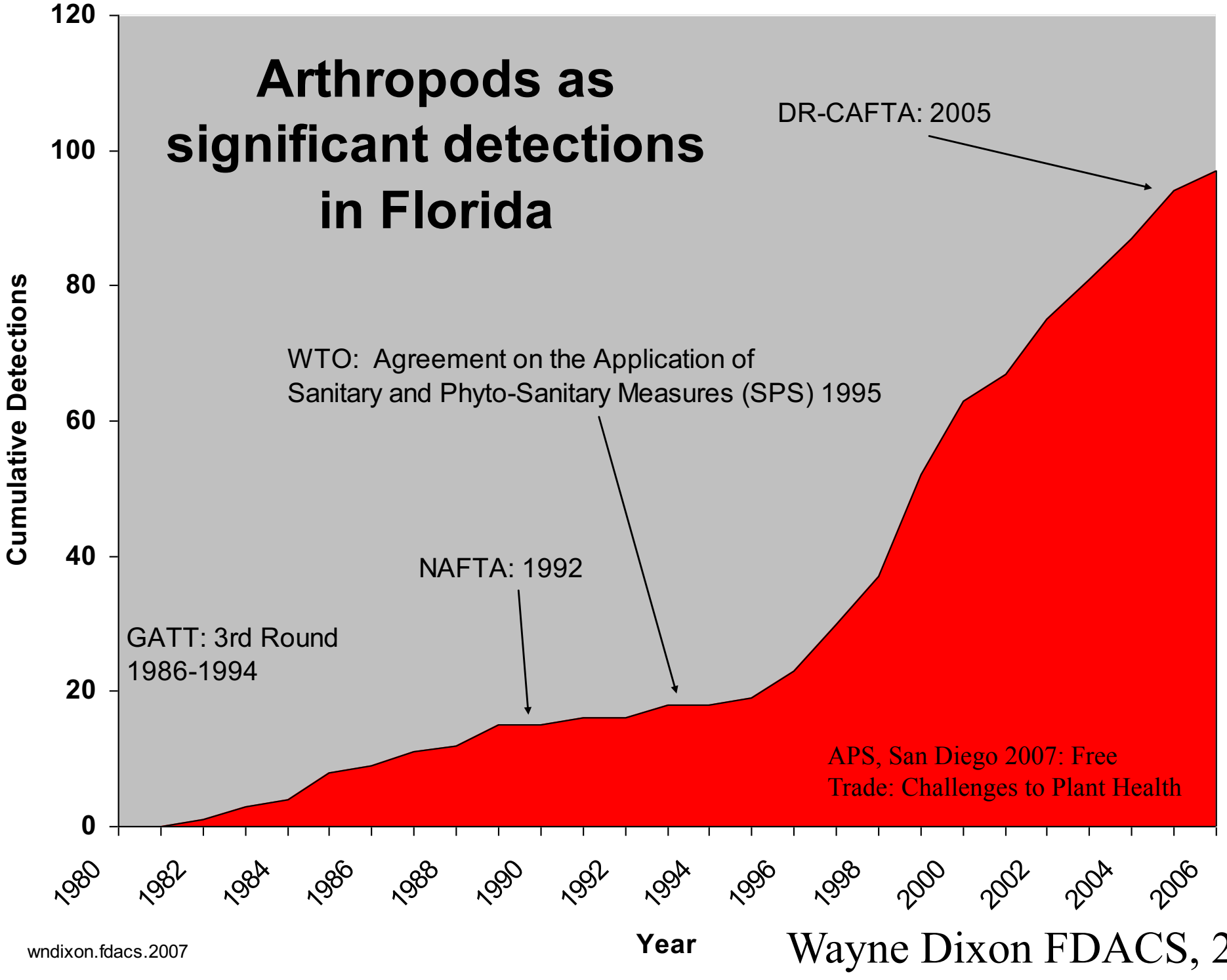
TROPICAL FRUIT ENTOMOLOGY



Pathway analysis

wndixon.fdacs.2007

Wayne Dixon FDACS, 2007

Why pests?

- Short life cycle
- High reproductive rates
- Feed on plants
- Adapt quickly to changing environments
- Acquire pesticide resistance
- Many are secondary, few are key pests.

Key Pests:
Vectors of Plant Pathogens

Ambrosia beetles

IPM:
Integrated Pest management

Combine several complementary pest control methods in a mutually enhancing way to reduce pest populations to less than damaging numbers.

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IPM: key steps

1. Know your cropping system - grow healthy crops
2. Know your pests and the damage they cause
3. Monitor- Scout for pests
4. Decision making
5. Intervention (control)
6. Record keeping

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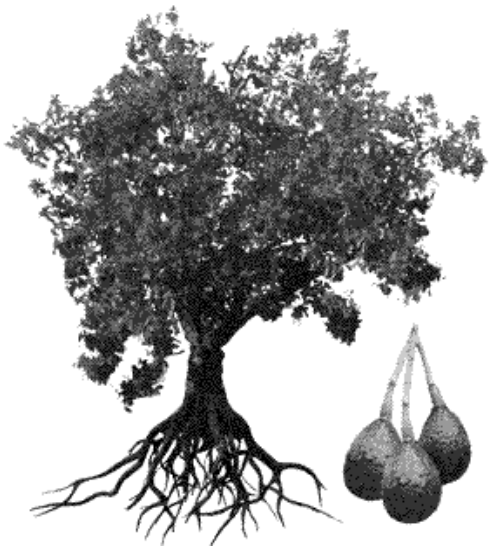
IPM Step 1:
Know your cropping system

Best way to prevent pest problems: **grow healthy crops**

Nutrition - water management - resistant cultivars - spacing



Tropical Fruit Production:

- Perennial: Trees 30 years or more (permanent habitat): avocado, mango, litchi, longan, etc.
- Temporal setting: 2-5 years: passion fruit, papaya, banana.

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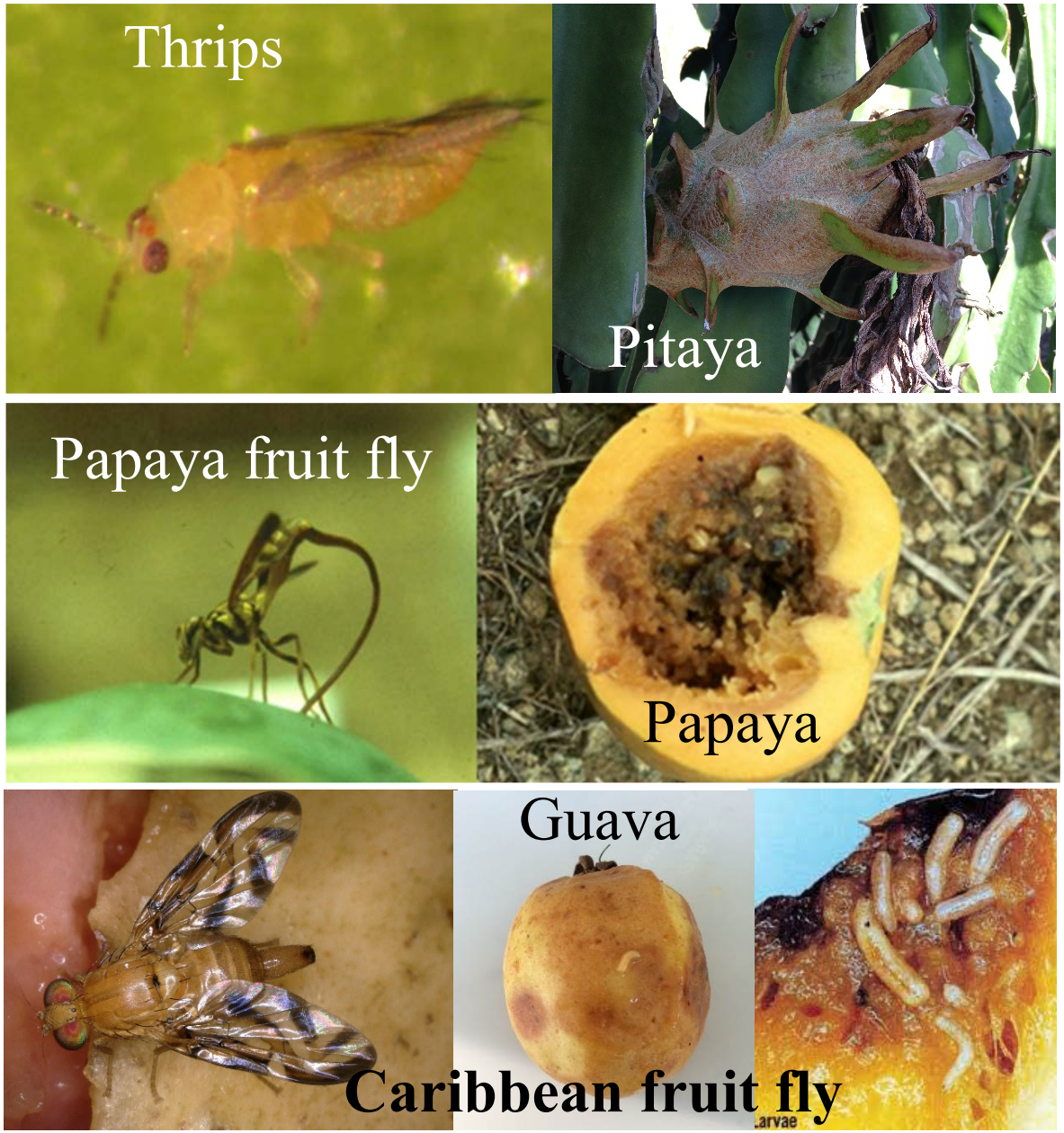
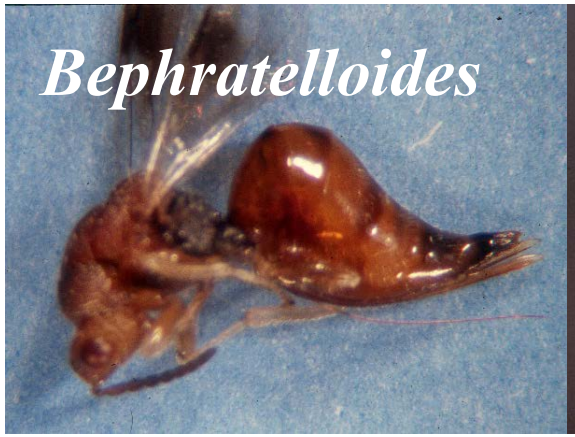
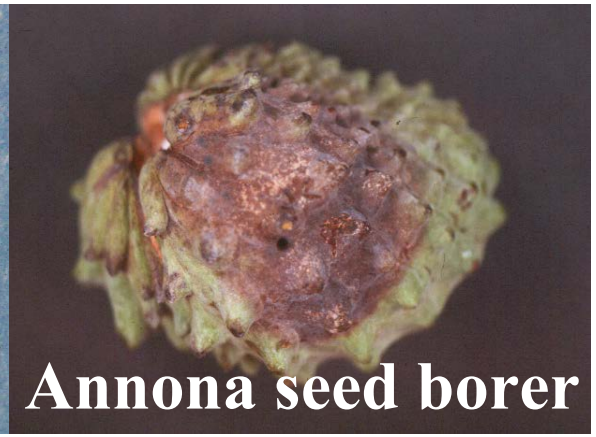
IPM Step 2:
Know your Pests and the damage they cause

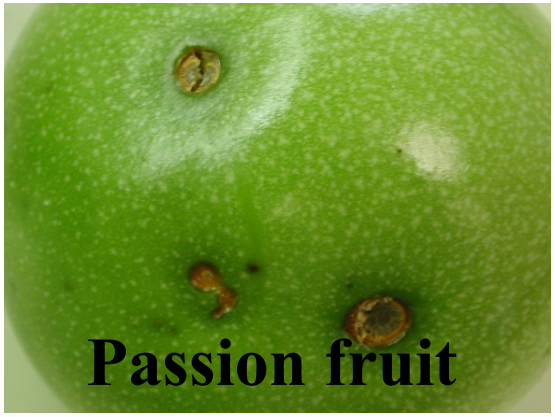


IPM Step 2: Know your Pests





IPM Step 2:
Know your Pests and the damage they cause



TSHB

Avocado

IPM Step 2:
Know your Pests and the damage they cause

http://trec.ifas.ufl.edu/tropical-entomology/index.php

IPM Step 3:
Monitor- Scout for pests

- Monitoring is always advised, but, very few times practiced.
- Through monitoring, accurate information is obtained to make management decisions
- **AVOID NASTY SURPRISES…NEW PESTS…CROP LOSES…**

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IPM Step 3:
Monitor- Scout for pests

Magnifying glass lens

10-15 X

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• Sampling mango panicles for thrips

IPM Step 3:
Monitor- TRAPS and lures

Jackson trap
Moths &
Fruit flies

McPhail trap
Fruit flies

Multi-funnel
Lindgren trap

Lures in different
formulations

Wood boring insects

IPM Step 4:
Decision making

Economic Threshold: the insect's population level or extent of crop damage at which the value of the crop destroyed exceeds the cost of controlling the pest.

- For key pests (aggressive disease vectors) economic threshold is close to ZERO.

- For some pests relatively low populations can be tolerated, specially if natural enemies are present.

IPM Step 5: Intervention (five control tactics)

- Cultural
- Mechanical and Physical
- Biological
- Chemical
- Regulatory

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IPM Step 5: Intervention
Cultural Control

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Make the crop environment less suitable for insect pests.

- Resistant or tolerant cultivars (GMO papaya, ect.).
- Avoid dense plantings, overcrowded overlapping branches.
- Weed management (i.e. thrips in carambola & pitaya).
- Time of harvest: (green mangos)
- Proper irrigation, nutrition, ect.



Mechanical and Physical Control

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- Prevent pest access to the host

fruit bagging

Sticky bands

Mechanical and Physical Control

- If the pests are already present, physically removing them.

Sanitation: Remove infested limbs and fruit.
Chipping ambrosia beetle infested wood (avocado).

Mechanical and Physical Control

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Trapping: Fruit fly traps in papaya

IPM Step 5: Intervention
Biological Control

The use of natural enemies—predators, parasitoids & pathogens, —to control pests

IPM Step 5: Intervention
Biological Control

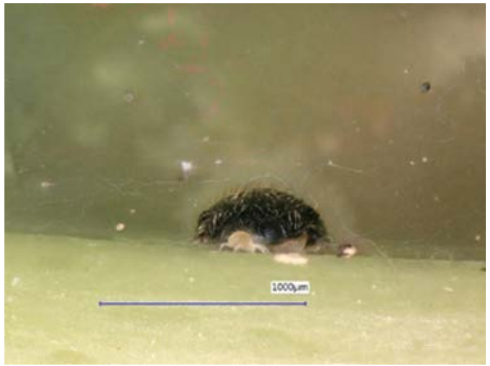
Naturally occurring predators, some commercially available

Amblyseius largoensis
Red palm mite, other mites

Stethoconus praefectus
Avocado lace bug

Ceraeochrysa claveri
soft-bodied insects and mites

Coccinellid beetles
soft-bodied insects



Stethorus utilis
Papaya mites

Podisus maculiventris
Predator of avocado loopers

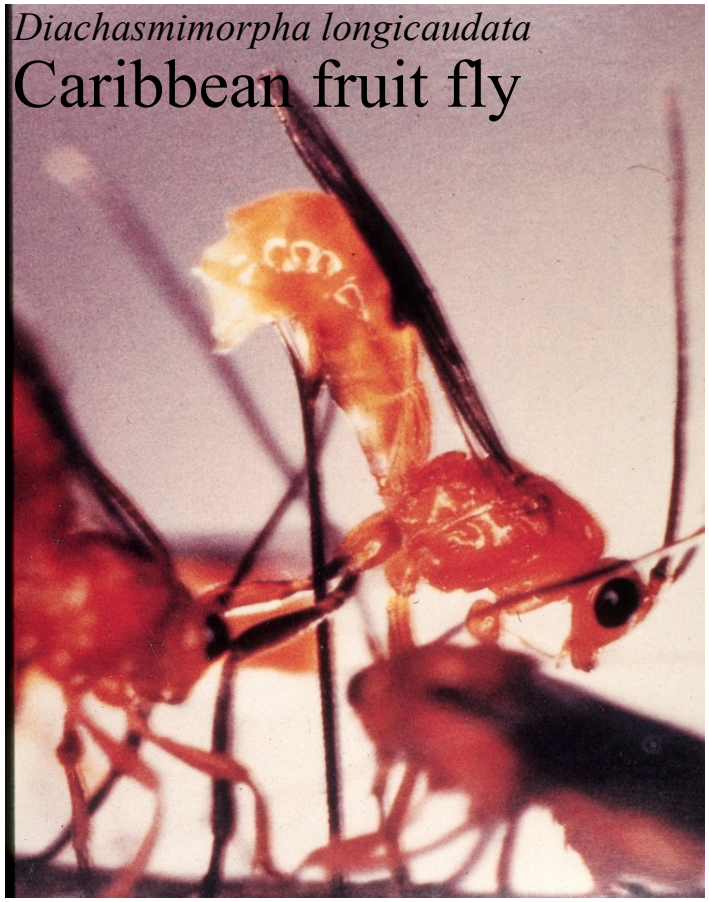
IPM Step 5: Intervention
Biological Control

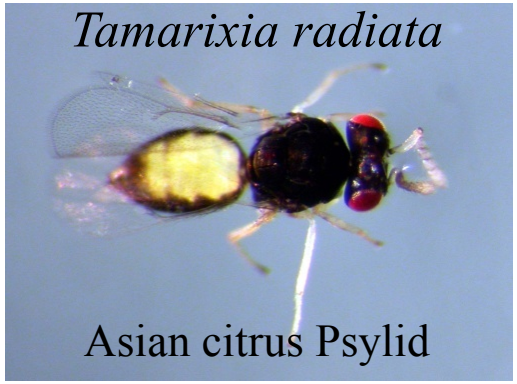
Parasitoids

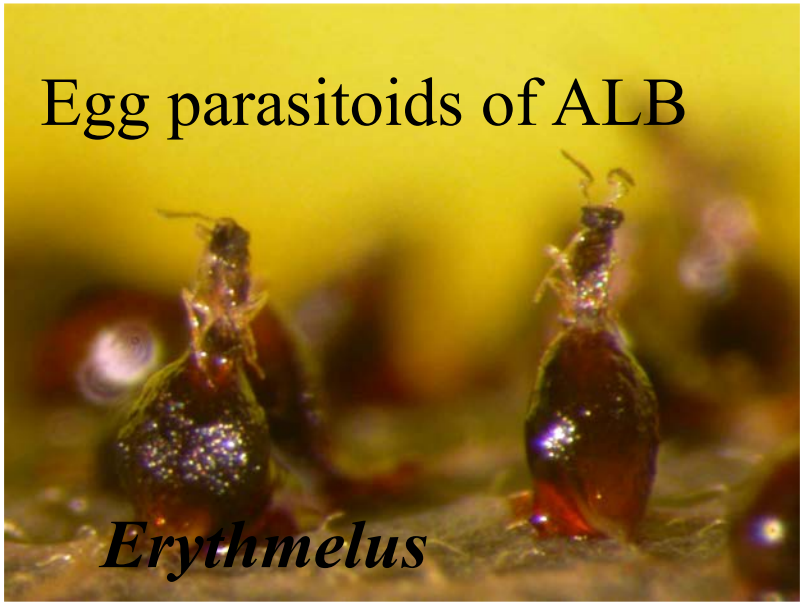
An organism (i.e. wasp of fly) that lives in a host organism and ultimately kills the host

IPM Step 5: Intervention
Biological Control

Parasitoids







IPM Step 5: Intervention
Biological Control

Entomopathogenic: Fungi, bacteria, viruses, nematodes

Beauveria bassiana
Metarhizium brunneum

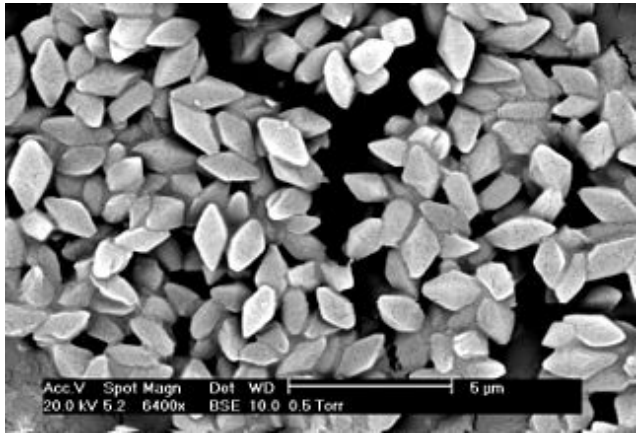


Photo credit: Jim Buckman

Bacillus thuringiensis (leps)

Granulosis virus (loopers)

IPM Step 5: Intervention
Chemical Control

Types insecticides:

- Broad spectrum: kill a wide variety of animals by attacking a system common to all (i.e. nervous system).
- Narrow spectrum: More selective (chitin inhibitors, growth regulators). Less harmful on natural enemies.

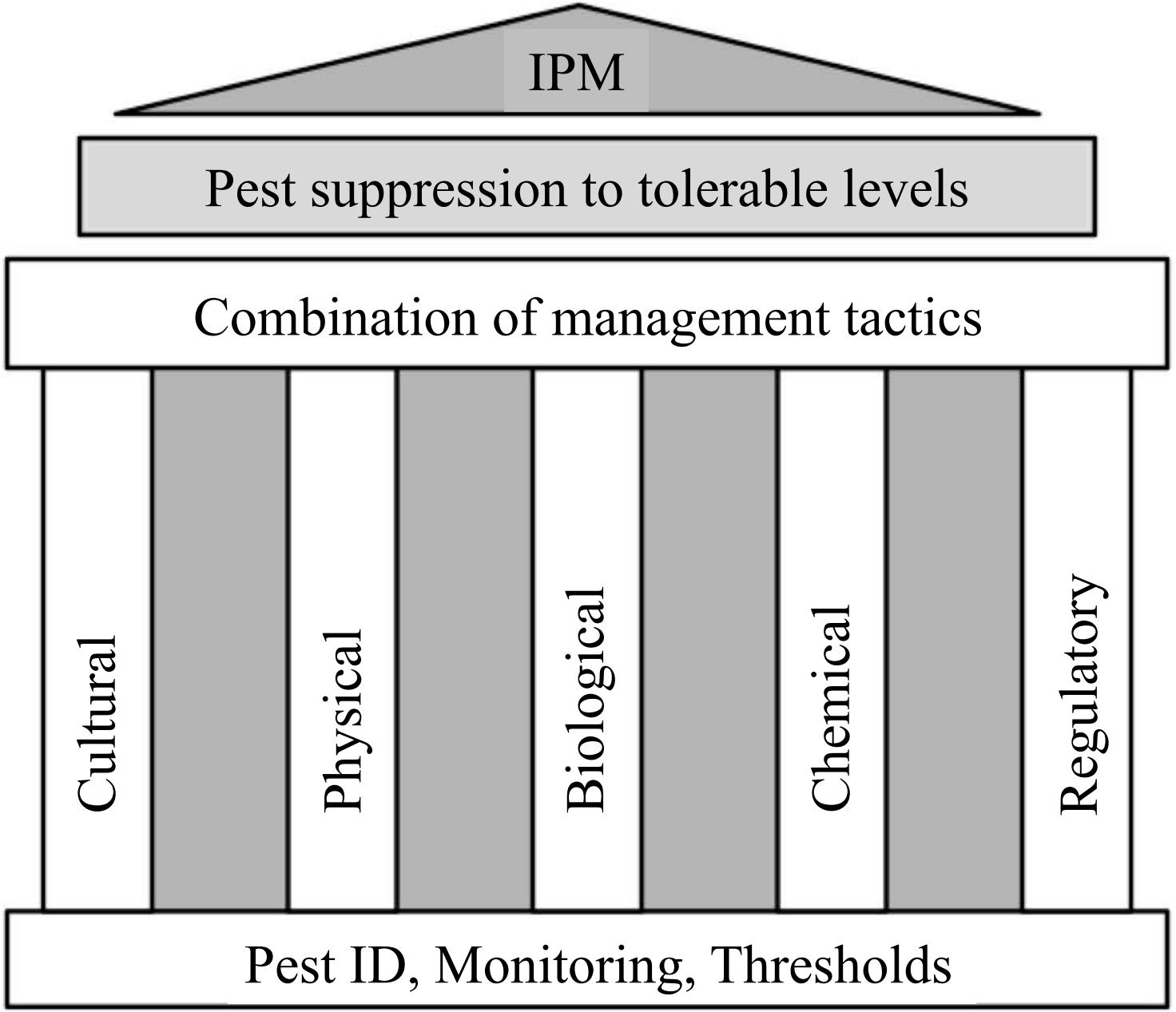
- Contact: must “touch” the pest to be deadly.
- Systemic: absorbed by plants and translocated to leaves and twigs to protect them from pests. Less harmful on natural enemies.

IPM Step 5: Intervention
Regulatory

Quarantine pests:

- a pest of potential economic importance and not yet present in an area, or present but not widely distributed and being officially controlled.

Oriental Fruit Fly


IPM
Pest suppression to tolerable levels
Combination of management tactics
Cultural
Physical
Biological
Chemical
Regulatory
Pest ID, Monitoring, Thresholds

Thank you!
Questions?