WHATS THAT BUG?

WHAT ARE WE GOING TO DO ABOUT IT?

AKA: Integrated Pest Management

Rancho Santa Fe Garden Club

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by

Linda Stewart,

San Diego Master Gardener

UNIVERSITY OF CALIFORNIA
Agriculture and Natural Resources
UC Master Gardener Program

About Master Gardeners of San Diego

- Founded in 1973 in Washington State
- Began in early 1980's in California
- First San Diego class was 1983
- We are volunteers whose mission is to educate the public on gardening and horticulture
- Affiliated with the UCCE, University of California Cooperative Extension
- Researched information from UC Davis
- We learn where to find the answers

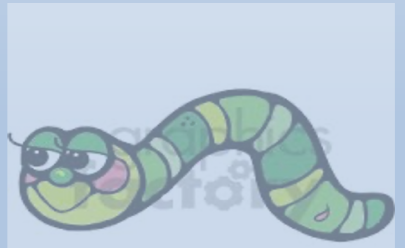

Photo Credit: Graphics Factory

Land Grant University Definition

- **Integrated pest management** is a sustainable approach that combines the use of prevention, avoidance, monitoring and suppression strategies in a way that minimizes economic, health and environmental risks. (1998)
- IPM is site-specific. Individual tactics are determined by the particular crop-pest environment scenario

WHAT IS IPM

- Proper Plant Care!
- An environmentally sensitive approach to controlling pests that does not rely totally on pesticides
- Focus is on the pest, not on the plant
- A strategy on combining several methods to manage pests
- Focus on prevention or suppression of pest problems with minimal impact on human health, the environment and nontarget organisms

IPM PARADIGM

E-Journal of entomology and biologicals *Journal of Integrated Pest Management*, Volume 10, Issue 1, 2019, 12, https://doi.org/10.1093/jipm/pmz010

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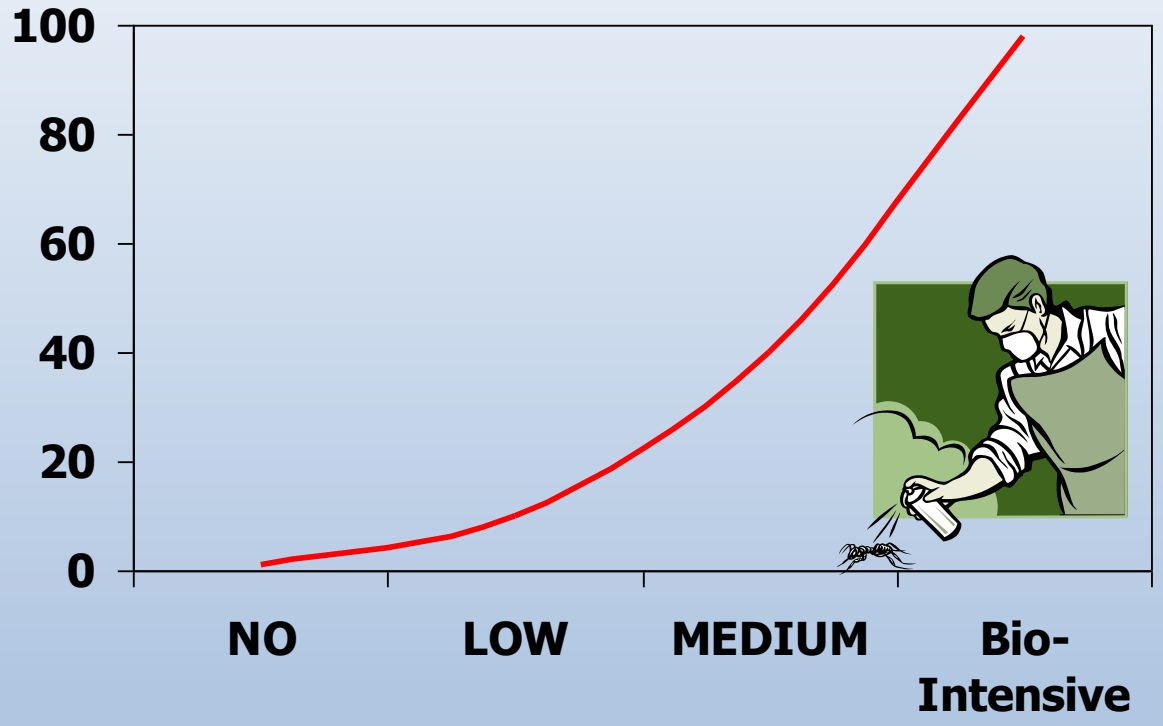
The IPM Continuum



Tips for Diagnosing Pest Problems

- Inspect the Damage
- Host Plants
- Other Kinds of Problems
- Cause Not Evident on the Plant
- Entire Plant Dead
- Too Late?

Photo Credit: Alamay

WHAT IS A PEST?

- Crawling, flying, invisible and slithering pests
  - Insects
  - Fungi
  - Mites
  - Mollusks
  - Bacteria and viruses
- Weeds
- Vertebrates
  - Bunnies
  - Rats, mice
  - Gophers

Photo Credit: Pinterest

LIFE CYCLES

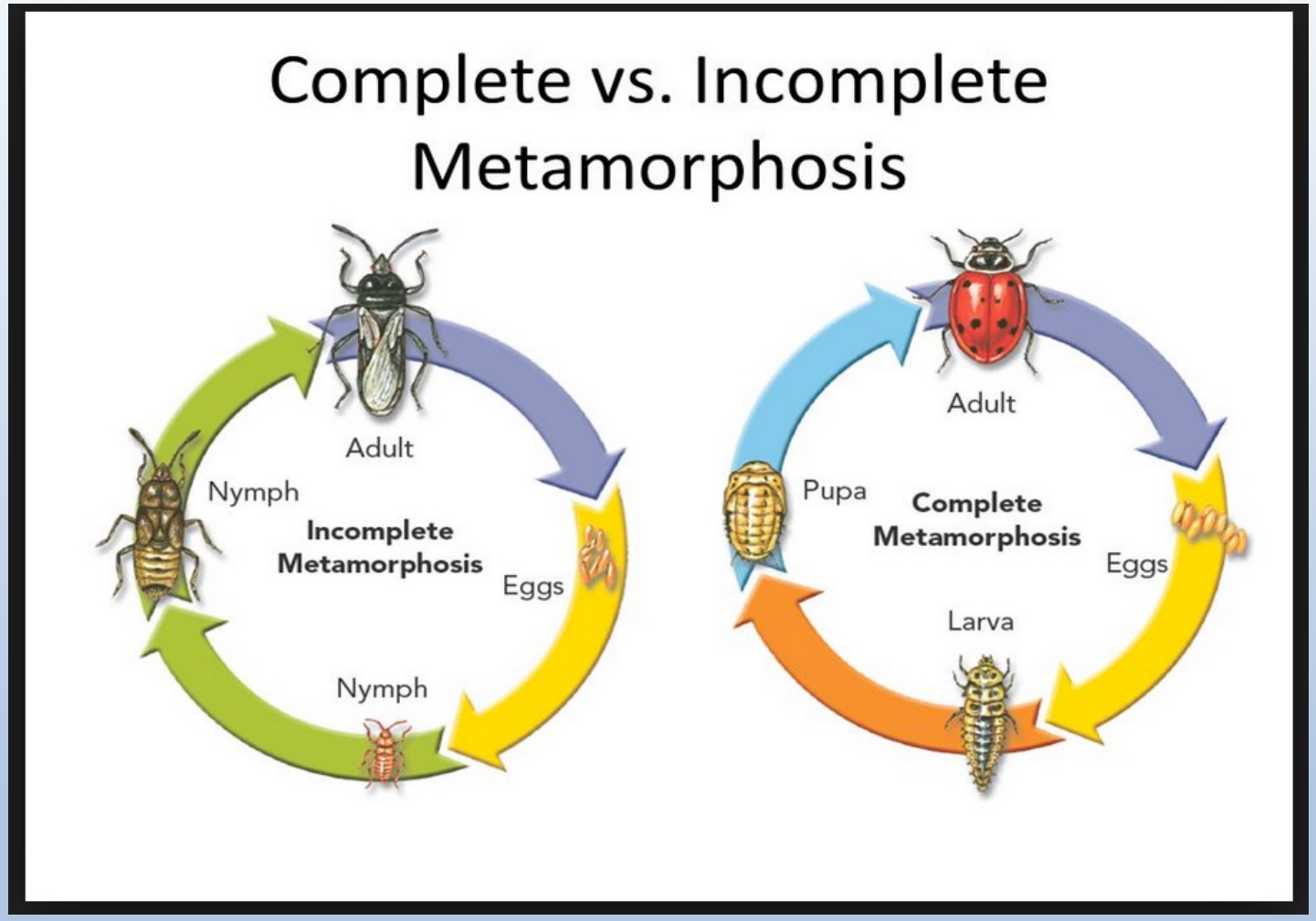


Photo Credit: Quizlet

DON’T LET SIZE FOOL YOU
Lady beetle adult and larva

© JAMES ROBINSON
AAM-AAES58245 - agefotostock

PEST CONTROL CONSIDERATIONS

- Your Goals in Home Garden
- Your Tolerance to Problems
- Your Microclimate
- Cost/Benefit Ratio
- Tolerance to Damage

Photo Credit: Classroom Clipart

MANAGING PESTS

- Host Plant Resistance
- Cultural Controls
- Biological Controls
- Behavioral Controls
- Mechanical/Physical Controls
- Microbial Controls
- Chemical Controls
- Legislative Controls

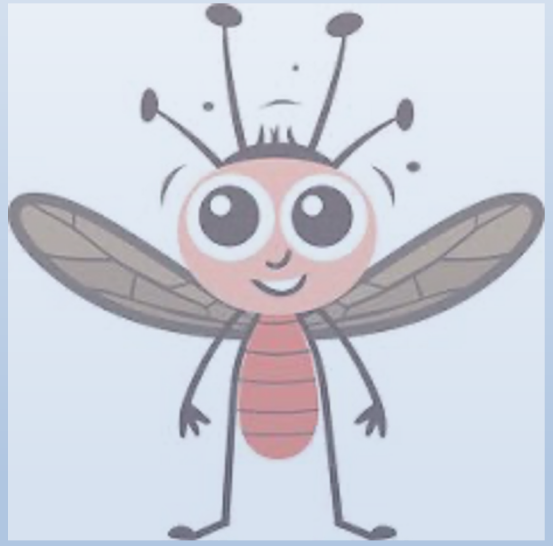


Photo Credit: Classroom Clipart

PLANT HOST RESISTANCE

- Buy pest resistant varieties
- Buy plant tolerant varieties
- Genetic engineering
- GMO

PhotoCredit: pngtree

MANAGING THE CULTURE

- **Prevention**
- Scouting the garden
- Proper soil
- Managing irrigation
- Modifying the environment
  - Best planting habits/crop rotation
  - Best plant care
- Sanitary practices
  - Tools
  - Breeding sites

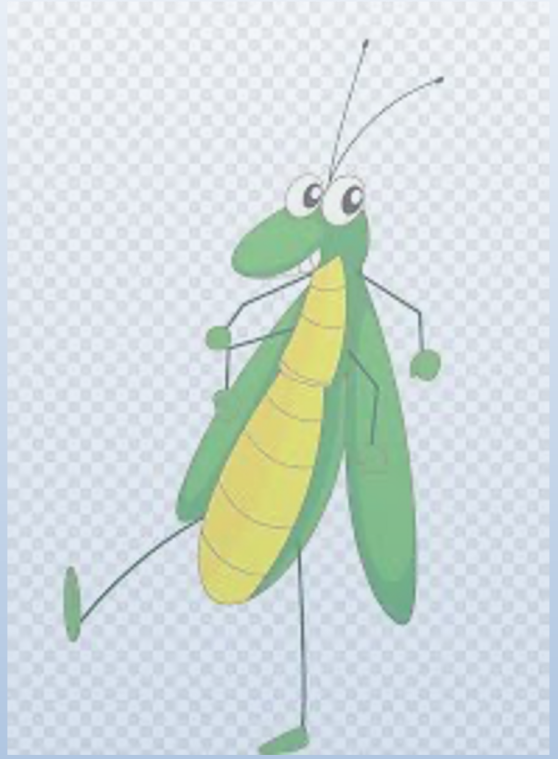


Photo Credit: f Nohat

BIOLOGICAL MANAGMENT

- Using natural enemies:
  - Pathogens --Competitive Species
  - Parasitoids --Antagonistic Organisms
  - Predators
- Beneficial Insects
  - Lady Beetles --Green Lacewings
  - Predatory mites --Mealybug Destroyer
  - Parasitic Nematodes --Spiders
- Irradiated Sterile Insects

Photo Credit: Shutterstock

BEHAVIORAL MANAGEMENT

- Baits and traps
- Disrupt mating patterns
- Use of Pheromones
- Using proper agents:
  - Microbials
  - Botanicals
  - Barriers

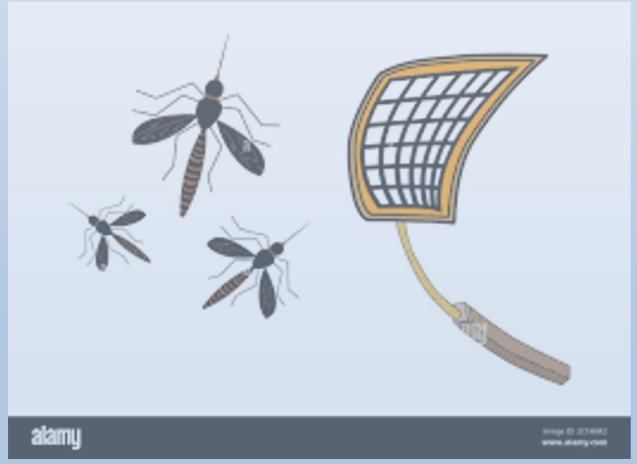


Photo Credit: Alamay

MECHANICAL/PHYSICAL MANAGEMENT

- Remove pest attractors
- Add pest detractors
- Use netting or screening
- Hand picking insects and weeds
- Control temp/humidity
- Lighting/sprinklers/owl/foil strips/sonic device

LEGISLATIVE CONTROLS

- Invasive insects
- Quarantines
- Local, state, national and international laws

Photo Credit: Shutterstock

Review: IDENTIFY THE PEST

- Insect damage
- Disease damage
- Weed damage
- Vertebrate damage
- Cultural damage

Photo credit: Classroom Clipart

FUNGUS GNAT

Photo Credit: https://homesteadbrooklyn.com

Photo Credit: Empress of Dirt

APHIDS

https://homesteadbrooklyn.com

Photo Credit: Turf Masters Lawn Care

BROWN SCALE

Photo Credit: https://homesteadbrooklyn.com

Photo Credit: Bug News

MEALYBUGS

Photo Credit: https://homesteadbrooklyn.com

Photo Credit: Family Food Garden

WHITEFLIES

Photo Credit: https://homesteadbrooklyn.com

Photo Credit: Palm Beach County Coop.Ext

GIANT WHITEFLIES

Photo Credit: Center for Invasive Species

Photo Credit: Southern California Hibiscus Society

ARGENTINE ANTS

Photo Credit: Wikipedia

Photo Credit: iStock Photo

INSECT TRIFECTA

- INSECTS →
- HONEYDEW→
- ANTS →
- SOOTY MOLD

Photo credit: Iron Tree Service

Fungus: POWDERY MILDEW

Photo Credit: https://ask2.extension.org/

Fungus: SOIL

Photo Credit: Top Crop Manager

Photo Credit: Rural Sprout

~~WORMS~~ AND CATERPILLARS

- Worms have no legs
- All caterpillars have 3 pair of true legs
- Caterpillars have prolegs on 5 or fewer segments--- Butterflies and Moths
- Other larva have 6 or more prolegs
- Beetle larva have no prolegs
- Fly larva have no legs
- Treat with BT product

SNAILS AND SLUGS

NOW, WHAT TO DO

- Nothing
- Wash with a strong stream of water
- Move out of harm's way
- Pick off the pest
- Toss the plant
- Treat with chemicals

BEFORE USING A CHEMICAL

✓Is the cost/benefit confirmed prior to use (using economic thresholds)?
✓Are pesticide efficacy and economics balanced by least negative effects on environment and human health?

✓Can you limit pesticide use to areas where pests actually exist or are reasonably expected?

✓Is your sprayers or other application device calibrated and pesticide is actually measured?

✓Are the rates adjusted based on soil type or pest pressure?

✓READ THE LABEL. THE LABEL IS THE LAW

CHEMICAL CONTROLS

- Pesticides:
  - Any chemical, natural or synthetic, that mitigates (kills, controls) a pest (animal or plant)

CHOOSING CHEMICALS

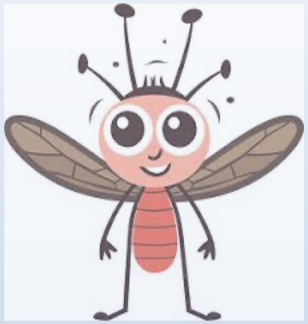
- Organic – Natural sources
  - Botanical extracts - Biologicals
  - Plant extracts. - Minerals
  - Inorganic substances
- Chemical –
  - Active ingredients
  - Inert Ingredients
  - Adjuvants

Photo credit: iStock

- Categorized As Broad Spectrum or Targeted
  - Pesticides -- Insecticides
  - Fungicides -- Miticides
  - Herbicides. -- Molluscicides

Review: INTEGRATED PEST MANAGEMENT

- The pesticide dilemma
- The IPM strategy
  - Diagnose the problem
  - Keep plants healthy
  - Monitor pests
  - Tolerate injury and damage
  - Choose appropriate treatment



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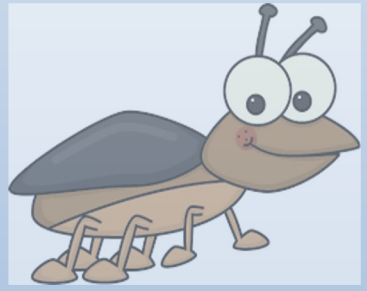

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REMEMBER

Most insects are your friends

Most insects do no harm

Most insects improve the environment

https://ipm.ucanr.edu

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Statewide Integrated Pest Management Program

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- Natural enemies gallery
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- Pesticide information
- Research
- Publications
- Events & workshops
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MAKE A GIFT

Homes, Gardens, Landscapes, and Turf > Alternatives to pesticides

PRINT

Biological control

Biological control is the beneficial action of predators, parasites, pathogens, and competitors in controlling pests and their damage. Biological control provided by these living organisms (collectively called "natural enemies") is especially important for reducing the numbers of pest insects and mites, but biological control agents can also contribute to the control of weed, pathogen, nematode or vertebrate pests.

MORE RESOURCES

Meet the Beneficials: Natural Enemies of Garden Pests (PDF)

Natural Enemies Handbook

Parasitic wasp laying its egg inside an aphid.

Information

- What is IPM?
- Beneficial Predators
- Common Garden Spiders
- Lady Beetles
- Parasites of Insect Pests
- Less Toxic Insecticides

Identification

- Natural Enemies Gallery

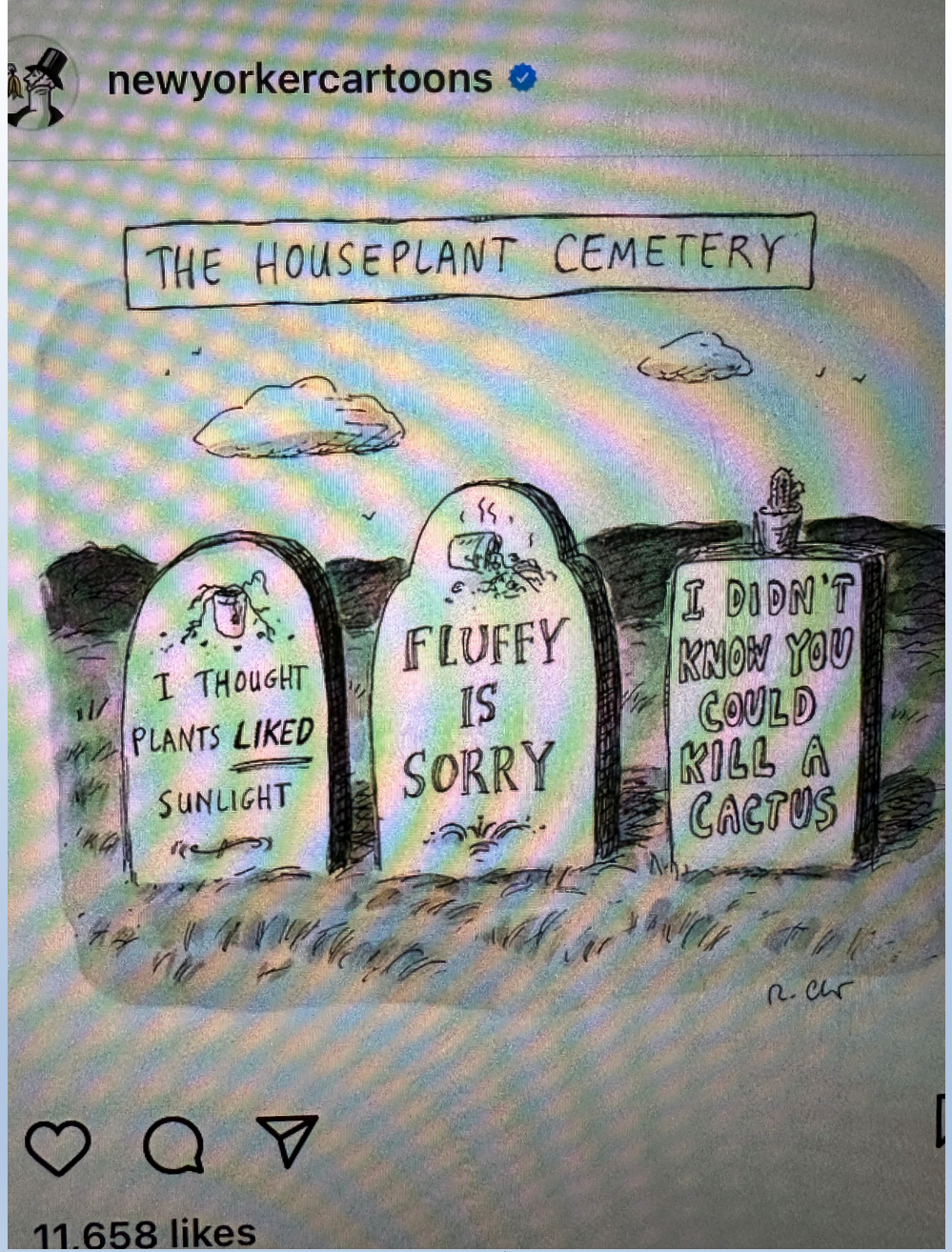
More information

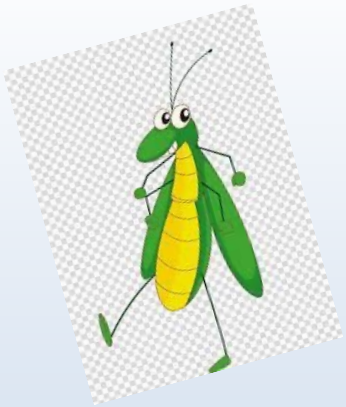
- Biological Control and Natural Enemies of Invertebrates

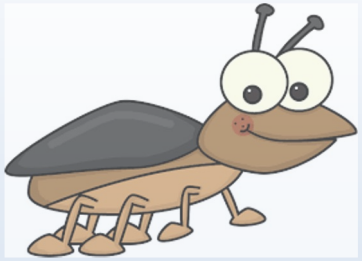
Recursos en español

- Manejo integrado de plagas y control biológico
- Depredadores benéficos
- Arañas comunes del jardín
- Catarinas
- Parásitos de insectos plaga
- Insecticidas menos tóxicos

https://ipm.ucanr.edu/PMG/menu.biocontrol.html


newyorkercartoons
THE HOUSEPLANT CEMETERY
I THOUGHT PLANTS LIKED SUNLIGHT
FLUFFY IS SORRY
I DIDN'T KNOW YOU COULD KILL A CACTUS
11,658 likes





THANK YOU

Thank you

- Credits: Master Gardener Handbook
- Presentation given by Cheryl Willen, IPM Advisor UCCE
- Presentation by Eric Middleton, Mexican Fruit Fly
- UCANR resources
- *Journal of Integrated Pest Management*, Volume 10, Issue 1, 2019, 12, https://doi.org/10.1093/jipm/pmz010
- The Amazing Internet

Finding UC Resources

- Google – or any browser
  - ucanr……
    - Example. ucanr pesticides
  - UCDavis…….
    - Example. ucdavis pest notes

OBJECTIVES

- Define IPM
- State the six tenants of the IPM Paradigm
- List 5 tasks to decrease/prevent garden pests
- Name 3 reasons when chemicals are indicated
- What is the importance of the agent's label?
- Name 10 pests