



University of Nevada  
Cooperative Extension

***IPM THE LANDSCAPE  
OR SUSTAINABLE PEST  
MANAGEMENT***

**M. L. Robinson, Specialist,  
ASSOCIATE PROFESSOR UNCE**

IN GODS KITCHEN

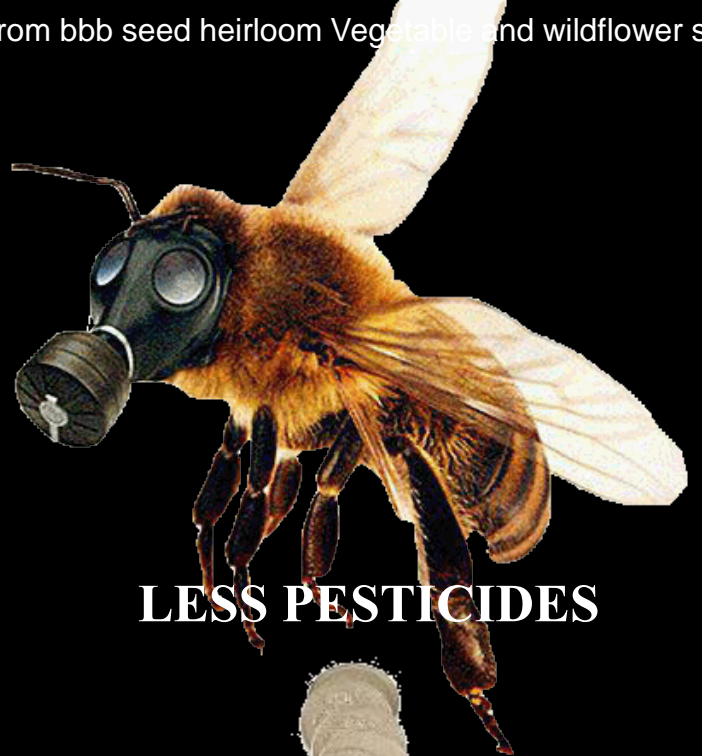
WHAT ARE  
YOU  
COOKING?

... LAS VEGAS ...  
Why?



# 4 SAVINGS

**STOP PEST RESISTANCE**

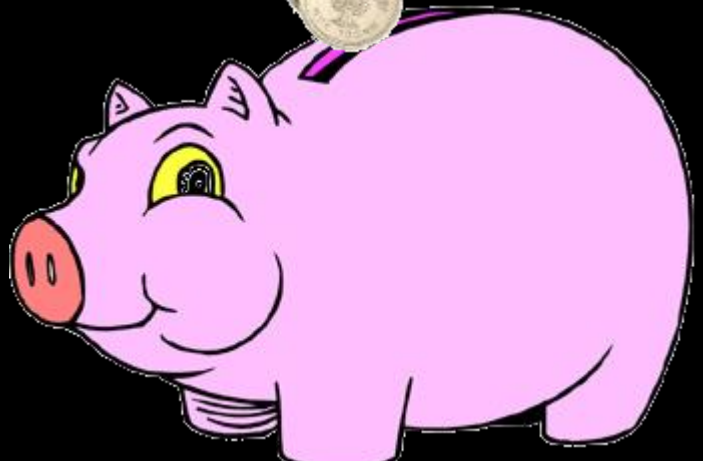


**LESS PESTICIDES**

**Protect The Environment**



**SAVE MONEY**



# ***IPM: OBJECTIVES***

**SOMETIMES IT IS HARD TO  
DECIDE WHICH WAY TO GO!**



# ***IPM: OBJECTIVES***

- **REDUCE PESTICIDE USE**
- **KNOW YOUR CHEMICALS AND CHOOSE WISELY**
- **REDUCE PESTICIDE RESISTANCE**
- **CONSERVATION OF BENEFICIAL INSECTS AND OTHER ORGANISMS**
- **MAKE BETTER MANAGEMENT DECISIONS**



# ***IPM: OBJECTIVES***

- **CREATE & MAINTAIN AN ATTRACTIVE, ENVIRONMENTALLY FRIENDLY LANDSCAPE**
- **KEEP IN TOUCH WITH THE LANDSCAPE**
- **EARLY DETECTION AND TREATMENT**
- **MAINTAIN WATER QUALITY**
- **REDUCE HEALTH HAZARDS**
- **REDUCE COST & INCREASE PROFITABILITY**

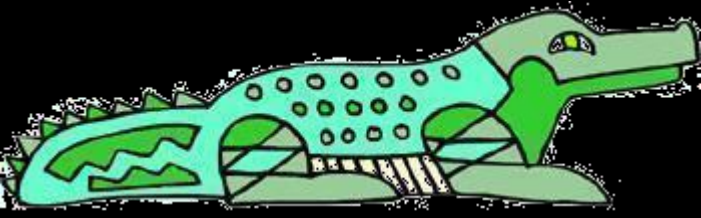
# ***IPM: MANAGEMENT OPTIONS***

- **ORGANIC INSECTICIDES :**
  1. **PESTICIDES THAT ARE TRULY ORGANIC THEMSELVES (USDA ORGANIC CERTIFICATION ON THE LABEL)**
  2. **PESTICIDES THAT ARE PERMITTED TO BE USED IN ORGANIC PRODUCTION THEY MAY OR MAY NOT BE ORGANIC THEMSELVES (MOST COMMON) BT'S**
- **BIOLOGICAL-CONTROL AGENTS ( BENEFICIAL INSECTS, MITES AND NEMATODES OVER 50 DIFFERENT BIO -CONTROL AGENTS AVAILABLE )**
- **TRAPS**
- **CONSERVATION OF NATIVE BENEFICIALS**

# HISTORICAL LOOK AT PEST CONTROL



ANCIENT PEST CONTROL APPEALING TO THE GODS





# ***HISTORICAL LOOK AT PEST MANAGEMENT***

*(FROM Dr. BOB STAUFFER CES)*

- **PEST CONTROL FOR 5,000 YEARS**
- **FIRST OFFERINGS TO GODS OR OTHER RITUALS (LIKE DANCES)**
- **EGYPTIANS USED HERBS AND OILS FOR STORED GRAINS**
- **USE OF HERBS LIKE BASIL 3,000 B.C.**
- **950 B.C. FIRE FOR LOCUST CONTROL**
- **350 B.C. ROMANS USED OIL AND ASH**

# ***HISTORICAL LOOK AT PEST MANAGEMENT***

*(FROM Dr. BOB STAUFFER CES)*

- **CRUSADERS BROUGHT GROUND PYRETHRUM FLOWERS TO CONTROL LICE** (IF THEY HAD USED IT COULD HAVE STOPPED THE PLAGUE)
- **1100 A.D. CHINESE USED SOAP TO CONTROL PESTS**
- **1600's TOBACCO SOAKED IN WATER**
- **1700's FRENCH RECORDED HOST-PARASITE RELATIONSHIPS**
- **1850's BORDEAUX MIX USED (ARSENIC & COPPER)**
- **1873 DDT DEVELOPED IN GERMANY**

**YOU ALWAYS HAVE TO BE ONE STEP AHEAD**



FACEBOOK UNKNOWN AUTHOR

# ***IPM EQUIPMENT***



HAND LENS



LOUPE



LOUPE

HAND LENS



The image displays two different types of microscopes against a black background. On the left is a small, blue, handheld microscope with a vertical body and a small lens. On the right is a larger, beige laboratory microscope with a complex structure including an eyepiece, objective lenses, a stage, and a base. The word "MICROSCOPES" is centered between the two devices in white, bold, uppercase letters.

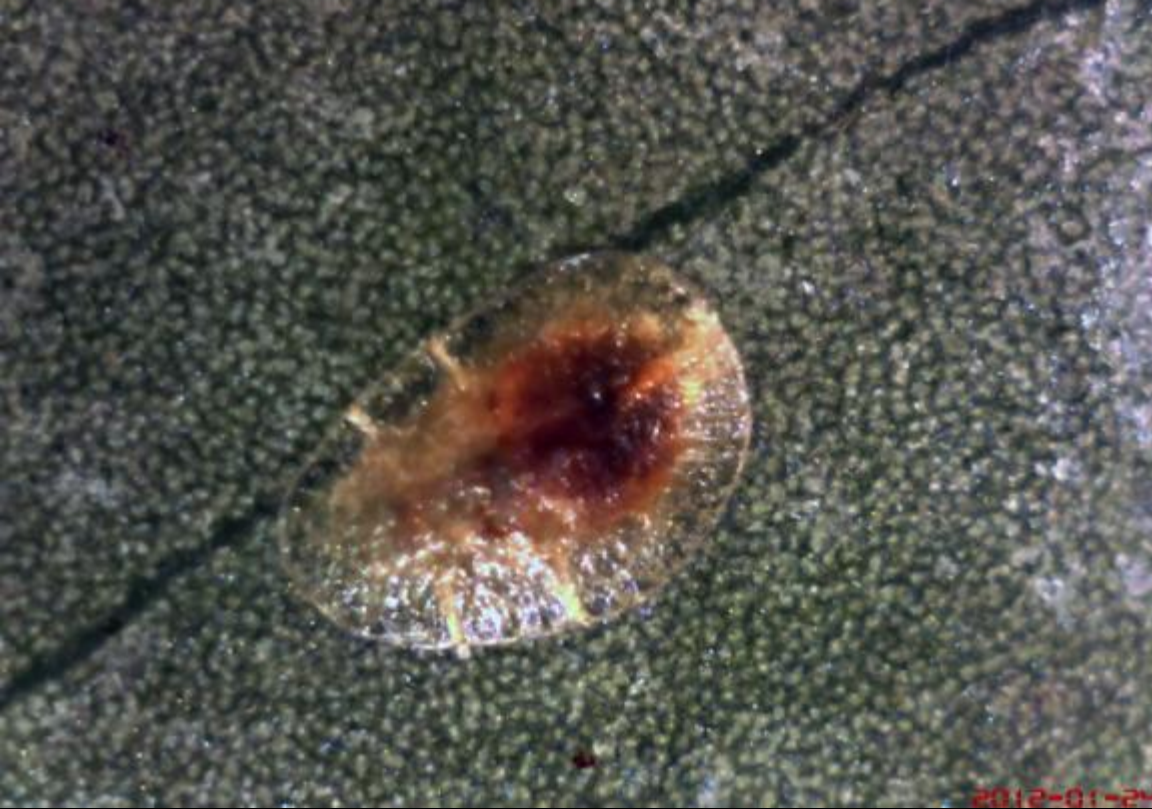
**MICROSCOPES**

**A SMALL HANDHELD  
MICROSCOPE**



## SMALL DIGITAL MICROSCOPES





## SMALL DIGITAL MICROSCOPES

**YOU NOW CAN USE YOUR  
SMART PHONE FOR THIS  
THERE ARE ATTACHMENTS  
YOU NOW CAN BUY**





# ***IPM EQUIPMENT***

**SMART PHONE**

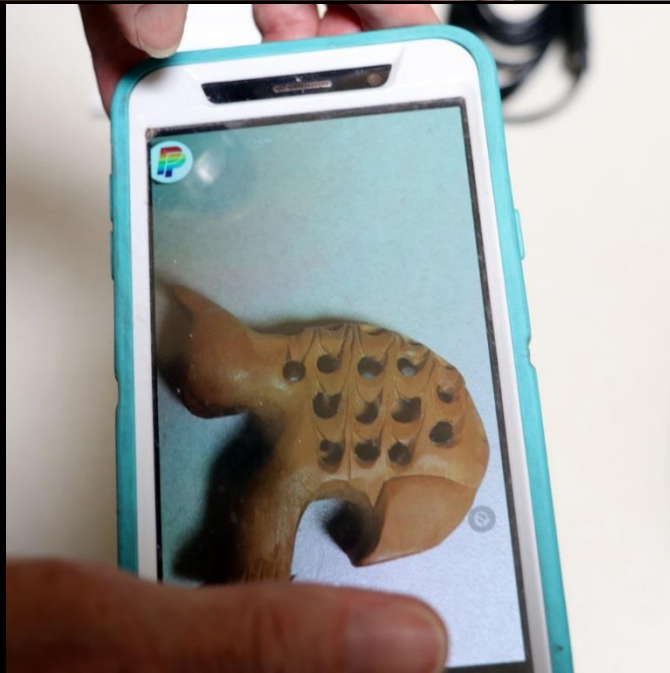
- **LOOK UP INFORMATION**
- **TAKE PICTURE OF PEST TO TEXT AND EMAIL TO SPECIALIST AND COLLEAGUES**
- **ADD AN ENDOSCOPE OR OTHER EQUIPMENT SUCH AS CLOSE UP LENS**
- **MAGNIFY WORKING, SPECIMENS, KEEP A PHOTO RECORD ETC.**

**YOU NOW CAN USE YOUR  
SMART PHONE FOR THIS  
THERE ARE ATTACHMENTS  
YOU NOW CAN BUY**





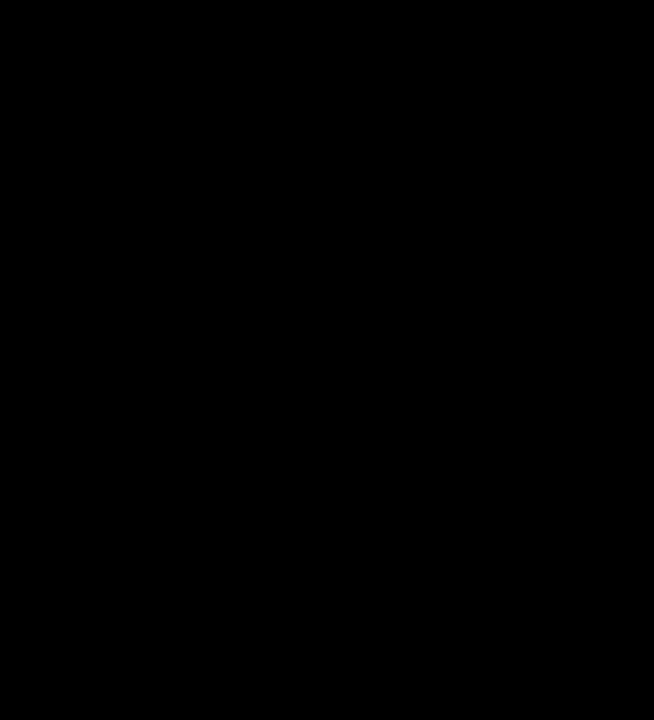
from eBay pix headband Jeweler magnifier





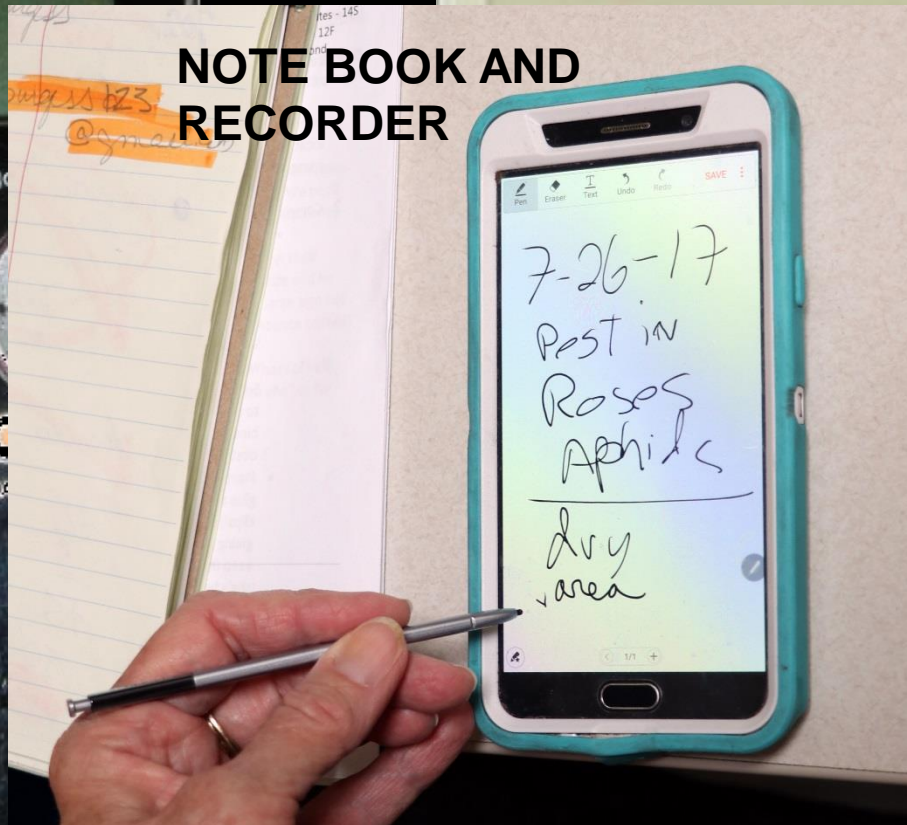
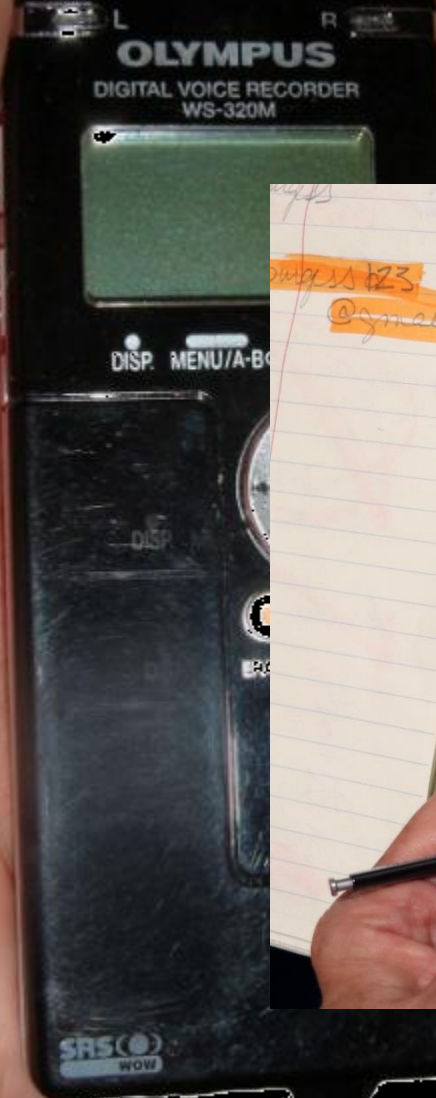








**YOU NOW CAN USE YOUR  
SMART PHONE FOR THIS**



**NOTE BOOK AND  
RECORDER**

*FLASHLIGHT*





# NATURE USES TRAPS





I find you irresistible.

It's my pharaohmones.



BIZARROCOMIC.BLOGSPOT.COM

Perry Kapo  
5.28.09  
w/Capozzola

Dist. by King Features

DR CAREN BONDAR

# YELLOW CARD TRAPS



# ***YELLOW TRAPS IN GREEN HOUSE***



# BLUE CARD TRAPS







**ROACH TRAP ONE NIGHT**



**EVEN SMALL SNAKES**





# RODENT TRAPS



# MasterLine®

By Univar

9616-1

012609

Fold Here ↗

JAN						JUL					
FEB						AUG					
MAR						SEP					
APR						OCT					
MAY						NOV					
JUN						DEC					

Fold Here ↖

# ***FLY TRAPS***



# PHEROMONE AND FOOD ATTRACTANTS



# CONTROL: TRY A FAKE WASP NEST



9/26/2017

40



# ***FUNGUS GNAT STICKY LIGHT TRAP***



# *HOW ABOUT A GIANT VENUS FLY TRAP TRAP FOR THE GARDEN*



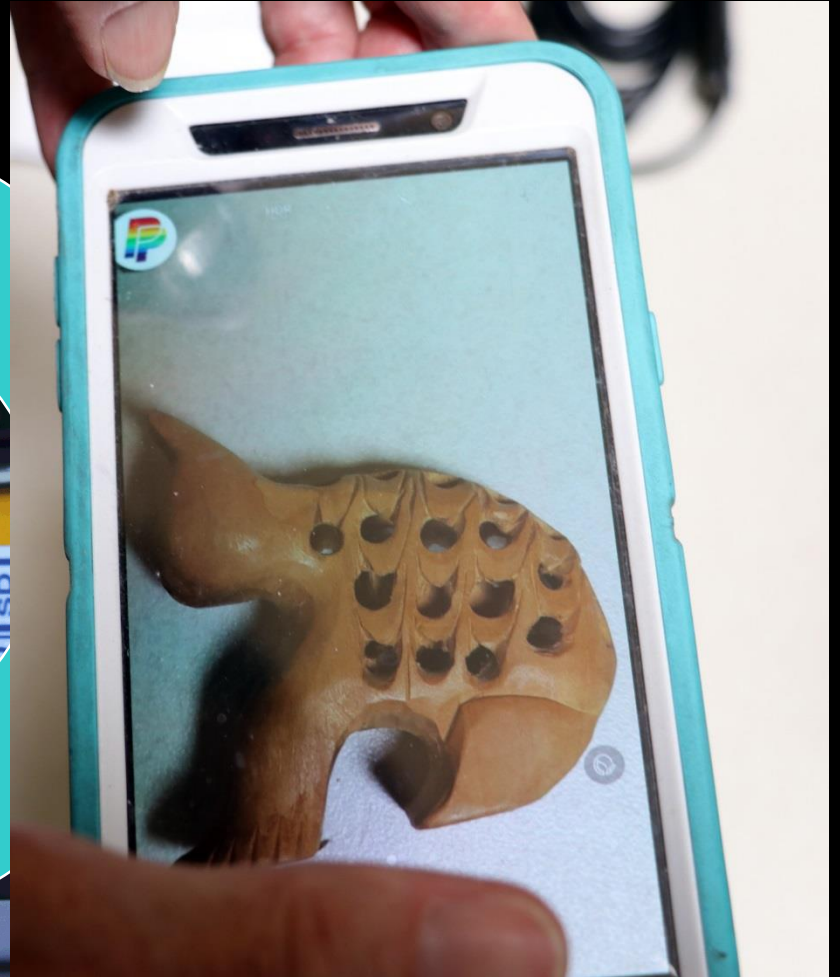
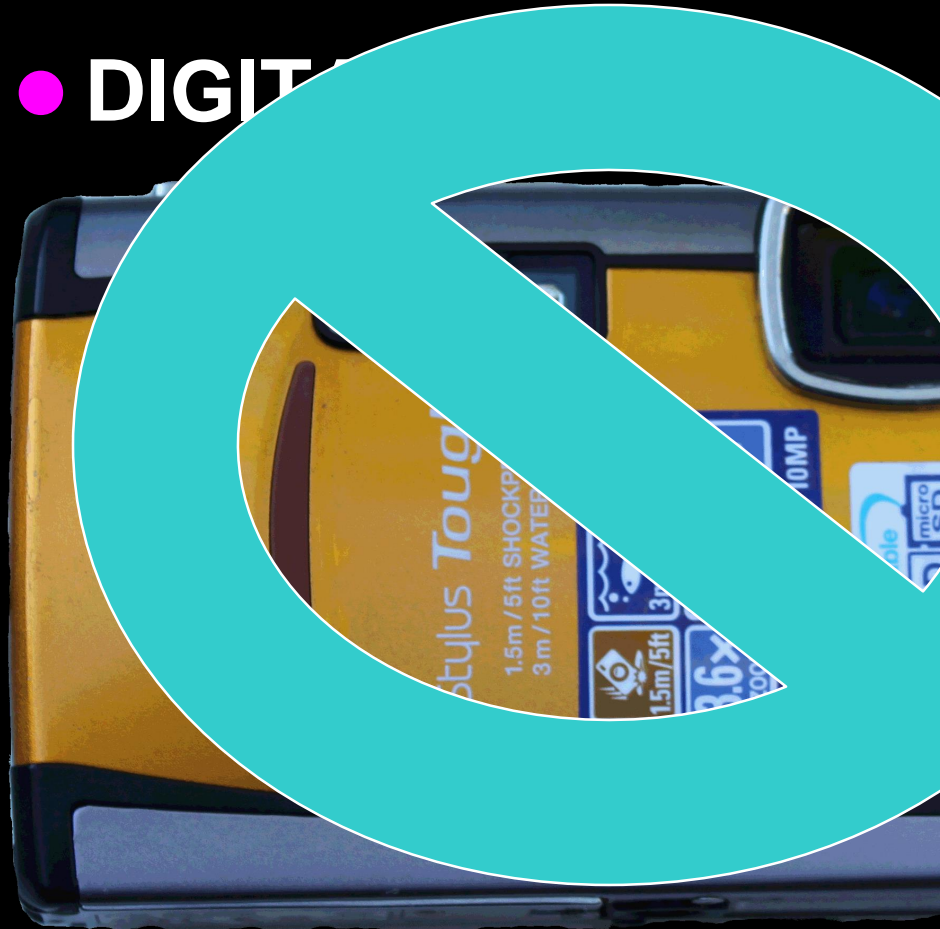
# BOTTLES AND ALCOHOL



**ICE CHEST TO KEEP  
SAMPLES COOL IN THE  
SUMMER**

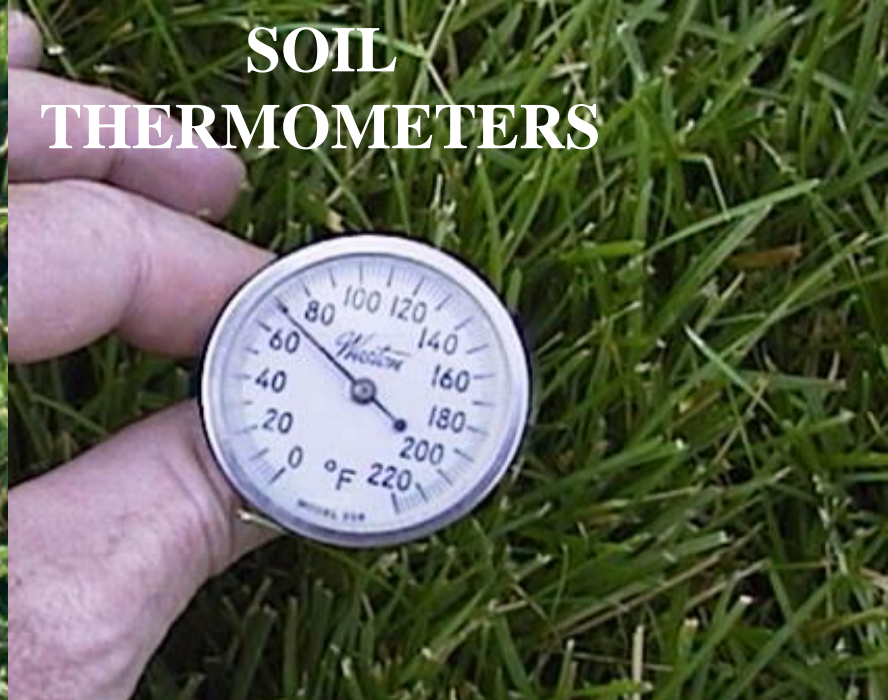
# IPM EQUIPMENT

- DIGITAL









# SOIL THERMOMETERS



# INFRARED THERMOMETERS



# TEMP & HUMIDITY



ARE YOU AFRICANIZED

Uh-oh!




**THE IPM PRACTITIONER**  
Integrated Management  
of Yellow Starthistle



**PESTS OF THE GARDEN AND SMALL FARM**  
Grower's Guide to Using Less Pesticide



**PESTS OF LANDSCAPE TREES AND SHRUBS**



**COMMON SENSE PEST CONTROL QUARTERLY**  
Non-Toxic Weed C



**THE IPM PRACTITIONER**  
IPM On Golf Courses



**1998 IPM ALMANAC**  
Your Definitive Resource for Integrated Pest Management

**Improve PROFITS and PROTECT**

- A list of helpful consultants, "how-to" information, and more than 1,000 IPM products
- IPM and Pesticide Use Guidelines
- Pesticide labels and information
- Long-term IPM practices



Local Insect Pest Management  
**for Lawns**



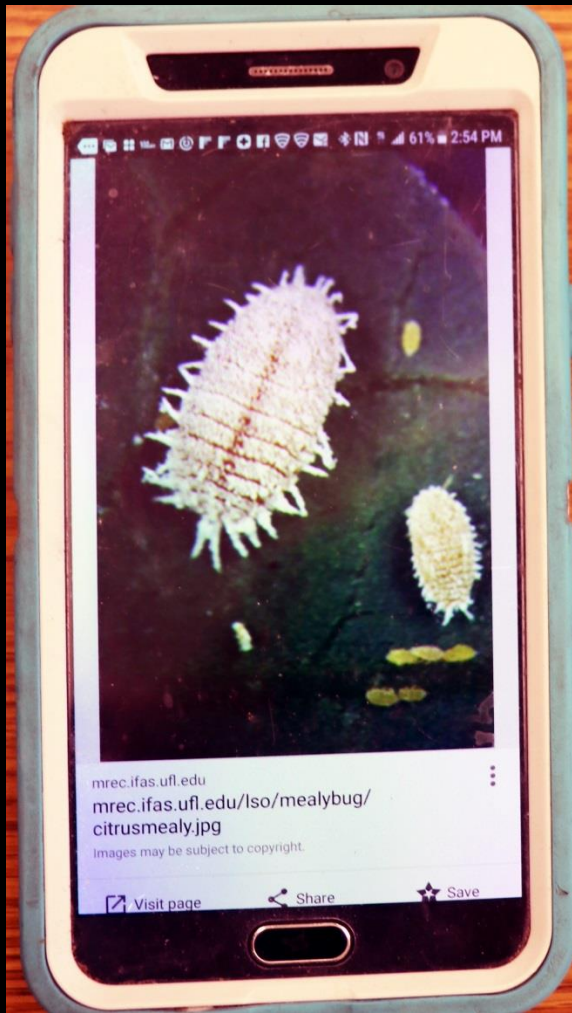
**GEPA**  
Citizen's Guide to Pest Control and Pesticide Safety



**COMMON-SENSE PEST CONTROL**







SUPPORT ▾

PRODUCTS ▾

BLOG

WHAT'S BITING ME?

BUGTALK™



# IdentifyUS

magnification & identification system

izes best-of-breed, commercial off-the-shelf technology to quickly & easily capture and send images of pest specimens to an expert e  
a return generates a written evaluation and assessment of the sample. Response times from image capture to final identification and  
tter of hours.

tion, portable microscope that communicates and sends its images wirelessly to an Apple iPod touch, iPad or iPhone mobile computing

# ***IPM EQUIPMENT***

- pH TEST STRIPS, pH AND SALINE TEST KITS
- SOIL PROBE & SAMPLE BAGS
- SOIL THERMOMETER
- BLACK LIGHT

# ***BLACK LIGHTS TO FIND SCORPIONS AT NIGHT***



# ***VACUUMING SQUASH BUGS***



# COVERS





**WHAT ELSE**



# AND YOU THOUGHT APHIDS WERE BAD IN THE GARDEN



PHOTO FROM UNKNOWN AUTHOR FROM THE INTERNET

**REMEMBER WHEN YOU THREW A SHOE AT ME  
AND I FELL SOMEWHERE BEHIND THE BED?**



**I REMEMBER TOO!**

***BASIC KNOWLEDGE FOR A  
GOOD IPM PROGRAM***

# *BROADLEAF WEEDS*

- **BROADLEAF WEED SEEDLINGS HAVE 2 LEAVES AS THEY EMERGE FROM THE SOIL.**



# SUCKING INSECTS



**SCALE**



**APHIDS**



**WHITEFLIES**

- **APHIDS, MEALY BUGS, SCALES AND WHITEFLIES ALL HAVE ALL HAVE PIERCING-SUCKING MOUTHPARTS. THEY SECRETE A STICKY SUBSTANCE CALLED HONEYDEW THAT CAUSES SOOTY MOLD TO FORM ON PLANTS.**

# *LIFECYCLE OF PLANTS*

- **AN ANNUAL PLANTS PLANT GROWS FROM A SEED, MATURES, FLOWERS AND PRODUCES SEED ALL IN ONE YEAR OR LESS.**



**SWEET ALYSSUM IS AN ANNUAL**

# ***PROTECT INSECTS***

**MOST INSECTS  
ARE  
BENEFICIAL  
AND SHOULD  
BE PROTECTED  
FROM  
PESTICIDES.**





# ***PROTECT INSECTS***

**MOST INSECTS ARE BENEFICIAL AND SHOULD  
BE PROTECTED FROM PESTICIDES SUCH AS  
THESE LACEWING EGGS**



# ***PROTECT INSECTS***

**MANY INSECTS ARE BENEFICIAL AND SHOULD BE PROTECTED FROM PESTICIDES SUCH AS THESE NEWLY HATCHED PRAYING MANTIS**





Hysatirical

@Hysatirical

**MIGHT AS WELL STAY AND  
HAVE ONE MORE**

**WIFE'S GOING TO CHEW MY HEAD  
OFF WHEN I GET HOME ANYWAY**



***PAPER WASP***  
***POLISTES FUSCATUS***



**REMOVE WEEDS THAT CAN HARBOR INSECTS, DISEASES,  
AND PRODUCE SEEDS**



**WEEDS  
IN THE LANDSCAPE**



# ***CONTINUOUS PESTS***

- **SOME PESTS ARE ALMOST ALWAYS PRESENT ON PLANTS LIKE APHIDS ON NEW GROWTH.**



**APHIDS ON NEW GROWTH**

# PEST MANAGEMENT



**LADY BUG LARVA**



**LADY BUG ADULT**

- **THE FIRST STEP IN BEING ABLE TO MANAGE PESTS PROPERLY IS TO IDENTIFY THE PEST. BY IDENTIFICATION YOU CAN DECIDE THE METHOD OF CONTROL OR IF YOU NEED TO TREAT AT ALL.**



**PRAYING MANTIS EGG CASE**



# PESTICIDE FAILURE

- **WHEN A PESTICIDE FAILS TO WORK IT IS USUALLY BECAUSE OF IMPROPER IDENTIFICATION, INCORRECT APPLICATIONS OR INCORRECT RATE AND TIMING OF APPLICATIONS.**



**SEVERE DAMAGE TO THE LAWN BECAUSE OF IMPROPER ID, INCORRECT APPLICATIONS AND INCORRECT RATE OF PESTICIDE.**

# *GOOD ENVIRONMENTAL STEWARDSHIP*

- **INSPECT KEY PLANTS FIRST—  
INSECTS**

➤ **ROSES, OLEANDERS, TOMATOES,  
WILLOWS, ASH - **APHIDS****

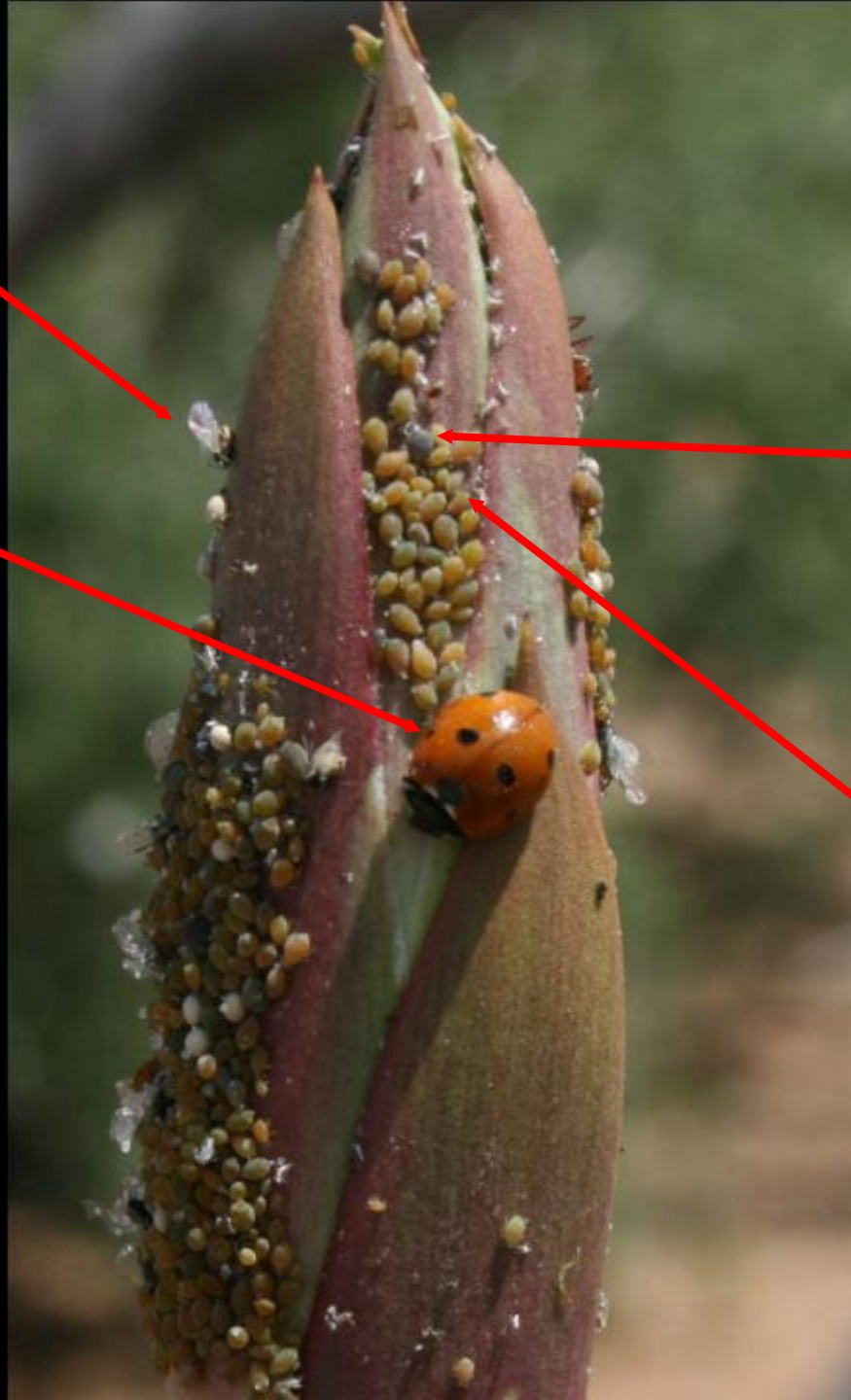


**WINGED  
BREEDER  
APHIDS**

**MUMMIFIED  
APHIDS**

**LADY BUG**

**APHIDS**





# ***BENEFICIAL ORGANISMS***



## ***PREDATORS***



# ***BENEFICIAL ORGANISMS***



# ***PARASITES***



# ***POLLINATORS***



**KNOW THE GOOD BUGS FROM THE OTHERS**

# **GOOD ENVIRONMENTAL STEWARDSHIP**

- **INSPECT KEY PLANTS FIRST—  
DISEASES**

- **Poplars, Willows - Cytospora Canker**

- **Roses, Euonymus, Apples, Cottonwoods -  
Powdery Mildew**







*DIFFERENT MANAGEMENT  
OPPORTUNITIES*

# ***DON'T BRING PEST HOME WITH NEW PLANTS***



***MAKE SURE IT IS A PROBLEM***



**TRAPS ARE USED TO  
SURVEY POPULATIONS  
AND TO HELP  
CONTROL SMALL  
POPULATIONS OF PEST**





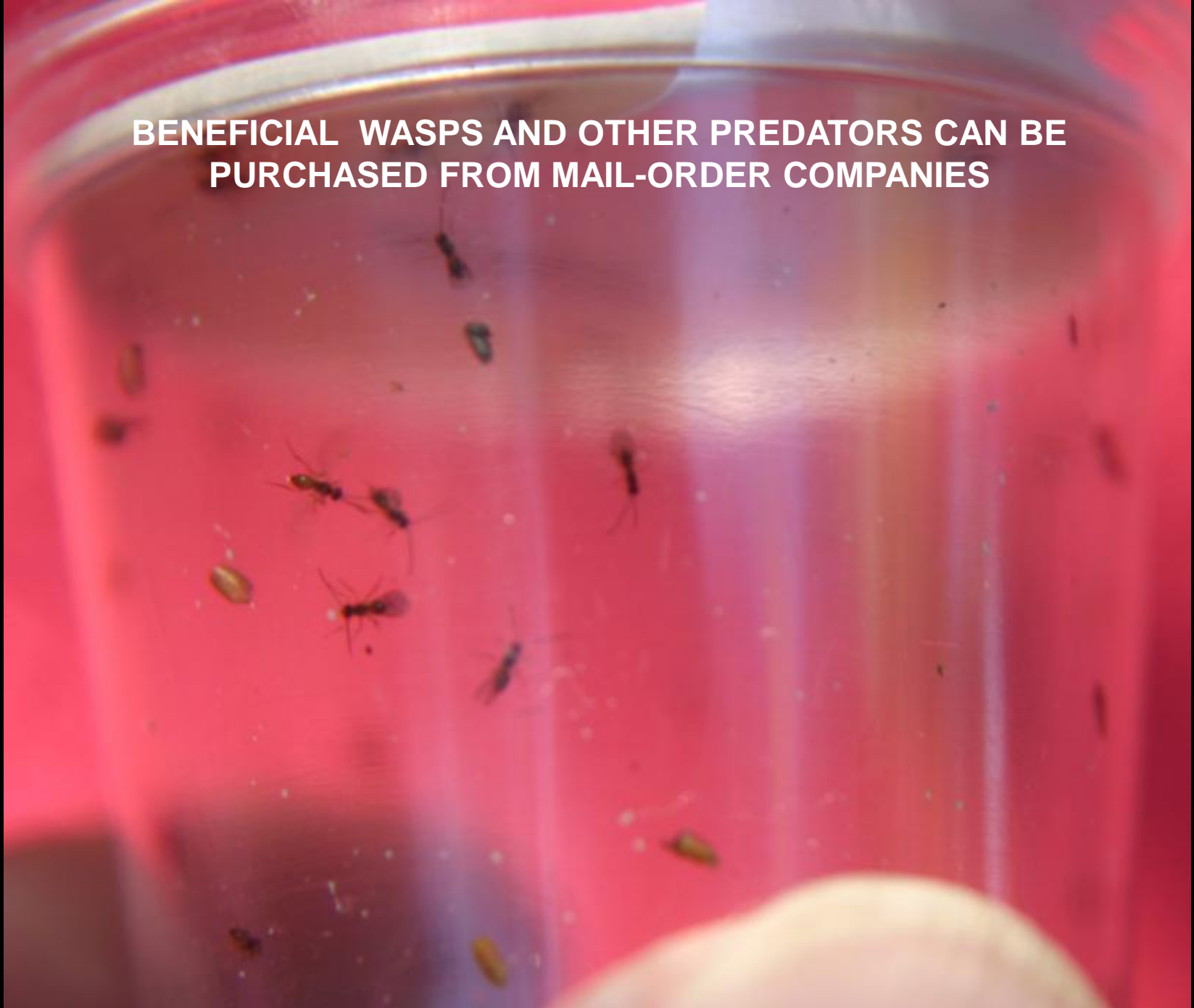
- **PROVIDE NESTING AREAS FOR NATIVE BENEFICIALS**

**WASP NEST IN THE GROUND**



**BEE BOARDS**

**BENEFICIAL WASPS AND OTHER PREDATORS CAN BE  
PURCHASED FROM MAIL-ORDER COMPANIES**







Bird-B-Gone  
Bird Slope

Bird-B-Gone  
Bird Spike

EEMAM

BIRD-X

BIRD REPELLEN

Bird-B-Gone  
Bird Spike

Bird-B-Gone  
Bird Spike

Bird-B-Gone  
Bird Spike

Bird-B-Gone  
Bird Spike

Bird-B-Gone  
Bird Spike

Bird-B-Gone  
Bird Spike

Steel  
EM

SPECK

Bird Control Products  
America's #1 Source in Affordable Effective Bird Control

SKOZ

Products  
Effective Bird Control

- 1" (13)
- 3" (13)
- 5" (13)
- 8" (21)



# *PIGEON EXCLUSIONS*



# ***PIGEON EXCLUSIONS***



# ***PIGEON DETERRENTS***



***ELIMINATE NESTING AND  
ROOSTING AREAS***



***BE INVENTIVE***



# PIGEON BIO CONTROL THE RARE SQUIGGER

FROM FACE BOOK Sun Gazing



***DON'T FEED  
PEST***





***DON'T FEED  
PEST***



*RAT DYING NEXT TO BAIT STATION*



# REMOVE THE PROBLEM BEFORE IT SPREADS

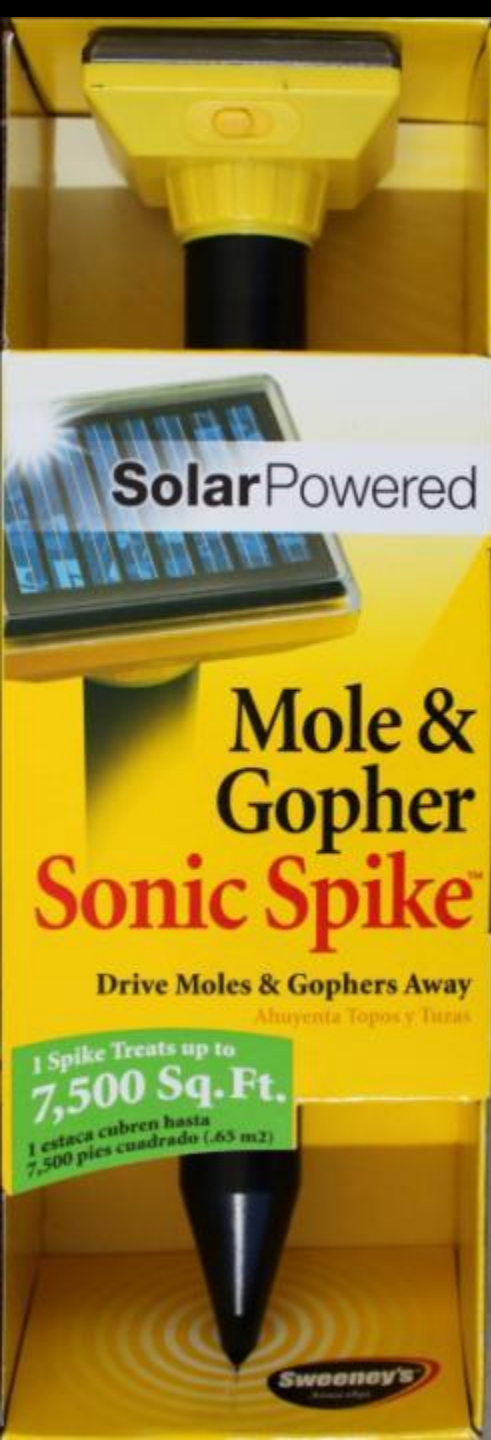


**FIRE BLIGHT IN FLOWERING PEAR TREES  
IN A PARK**

**WEEDS IN NURSERY  
PLANTS**



# OTHER DETERRENTS



**FOR INTERIOR  
PEST  
EXCLUSIONS  
ARE THE BEST  
PLACE TO  
START**



# ***GOOD ENVIRONMENTAL STEWARDSHIP***

- **LOOK AT ENTIRE PLANT  
TOP TO BOTTOM  
UNDER THE LEAVES  
IN LEAF LITTER**

**LOOK FROM TOP  
TO BOTTOM  
UNDER THE  
LEAVES**





**LOOK IN THE  
MULCH AND  
LEAF LITTER**



# ***GOOD ENVIRONMENTAL STEWARDSHIP***

- **LOOK AT ENTIRE  
PLANT  
TOP TO BOTTOM  
UNDER THE  
LEAVES  
IN LEAF LITTER**
- **PROBE THE SOIL**

# PROBE THE SOIL



**WHEN YOU SEE  
HONEYDEW LOOK FOR  
BENEFICIAL INSECTS OR  
PEST INSECTS**







# *GRAPE LEAF SKELETONIZER*



**EASY TO CONTROL  
WHEN SMALL IF  
LET GO CAN  
DEFOLIATE VINES**



9/26/2017

110



**FIND THE PRIMARY CAUSE OF THE  
PROBLEM BEFORE YOU TREAT**



# WHY ARE THESE PLANTS DIEING OR DEAD?



- DISEASE ?
- INSECTS ?
- LACK OF WATER ?
- NON DESERT PLANTS PLANTED WITH TEMPERATURE S ARE 100 + ?
- ?

# DON'T REPLANT WITH THE SAME TYPE OF PLANTS



**DON'T REPLANT WITH THE SAME TYPE  
OF PLANTS**



# DON'T REPLANT WITH THE SAME TYPE OF PLANTS



**FIND THE PRIMARY CAUSE ???**

**HERBICIDE DAMAGE**





# GOOD ENVIRONMENTAL STEWARDSHIP

◆ ACCURATELY IDENTIFY PESTS





# ***GOOD ENVIRONMENTAL STEWARDSHIP***

- **ARE THERE ANY PESTS PRESENT IN THE LANDSCAPE?**



- **ARE THERE ANY BENEFICIAL INSECTS OR OTHER ORGANISMS IN THE LANDSCAPE?**



# ***WHAT IS THE EXTENT OF THE PROBLEM ?***

- **HOW MANY PLANTS ARE AFFECTED ?**
- **A NEW OR LONG-STANDING PROBLEM ?**
- **WHAT IS THE NUMBER OF PESTS PER SAMPLE ?**
- **IS THERE A PATTERN IN THE LANDSCAPE ?**
- **IS THE DAMAGE DONE ? WHAT CAN YOU DO?**
- **WILL THE NEXT FLUSH OF GROWTH COVER IT ?**



**WHAT IS THE EXTENT OF THE PROBLEM ?**

**DOES THE DAMAGE EXCEED  
TOLERABLE LEVELS?**

**RESOURCES**

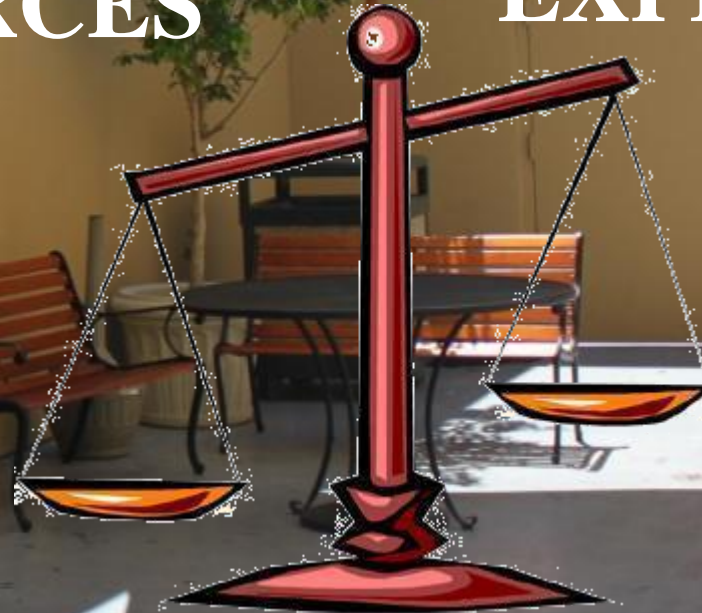
**EXPECTATIONS**



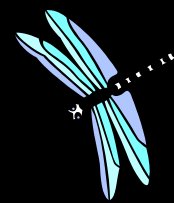
**MANAGEMENT**

**RESOURCES**

**EXPECTATIONS**



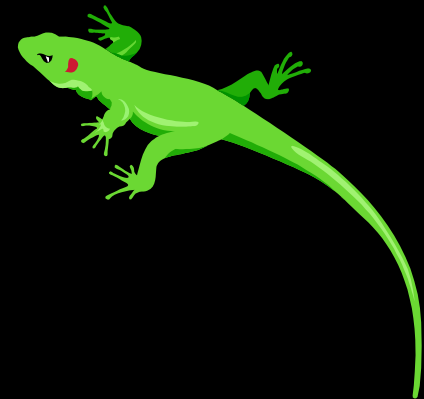
**MANAGEMENT**



**USE NATURAL AND  
BIOLOGICAL (LESS TOXIC)  
MANAGEMENT FIRST. PESTICIDES AS A  
LAST RESORT.**



**THE ABC'S  
OF GOOD  
PEST  
CONTROL**

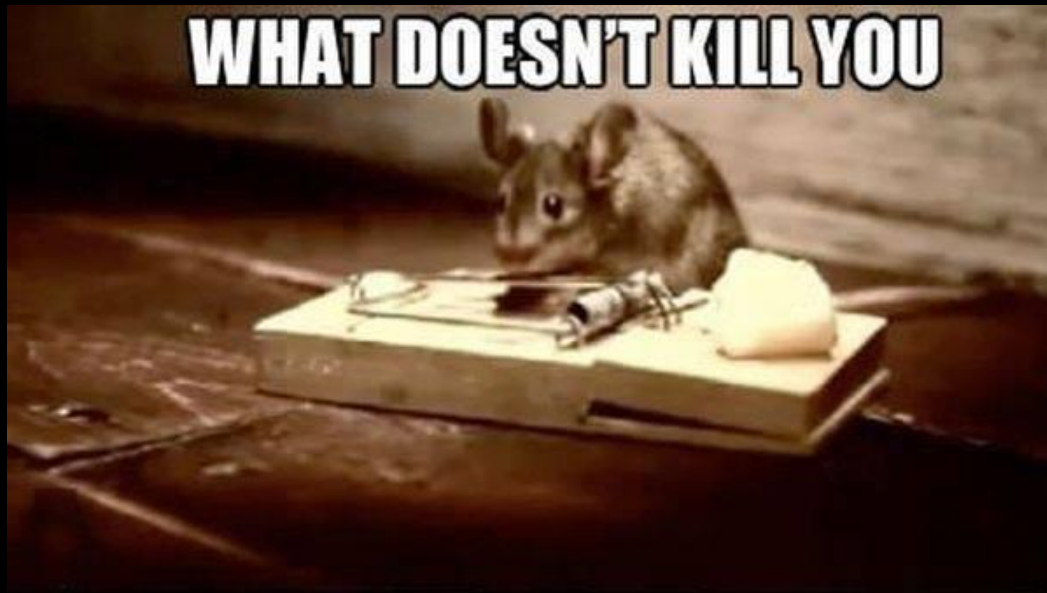


**ALWAYS BE  
CAUTIOUS**



***PEST CAN BE SMARTER THAN YOU THINK***

**WHAT DOESN'T KILL YOU**



**MAKES YOU STRONGER**



**Safer** BioNEEM<sup>®</sup>  
Natural Insecticide & Repellent

**INSECTICIDE & REPELLENT**  
For Trees, Shrubs, Ornamentals and Flowers

Controls aphids, bagworms, borers, budworms, caterpillars, scalebugs, leafminers, saws and weevils.



ACTIVE INGREDIENTS 89.4%  
Azadirachtin 0.50%  
NET WEIGHTS 89.9%  
TOTAL 100%

Keep out of reach of Children.  
**CAUTION**  
(See back panel for additional precautionary statements.)

Do Not Use on Food Crops  
**NET CONTENTS 8 FL. OZ.** 1676-1675-0000100



**Safer** Tree + Shrub & Vegetable  
**CATERPILLAR KILLER**

E.g. (Doubtful Damage)  
Concentrate  
Kills grasshopper larvae, cutworms, leg  
horns, cabbage looper, tomato horn  
worm, and caterpillars that eat leaves,  
fruit, stems and roots of trees, shrubs,  
ornamentals, and vegetable plants.



Use up to day  
of harvest.  
ACTIVE INGREDIENTS 97.4%  
Sulfur hexafluoride, 97.4%  
NET WEIGHTS 97.4%  
NET WEIGHTS 97.4%  
TOTAL 100%

Keep out of reach of Children.  
**CAUTION**  
(See back panel for additional precautionary statements.)

**NET CONTENTS 8 FL. OZ.** 1676-1675-0000100

# ***MECHANICAL & CULTURAL CONTROLS***



- **USE CLIMATICALLY ADAPTED PLANTS**
- **PUT THE RIGHT PLANT IN THE RIGHT PLACE**
- **FERTILIZE AND WATER WISELY**
- **AVOID HEDGING AND IMPROPER PRUNING**
- **DO NOT OVER USE PESTICIDES**
- **CHOOSE PLANTS THAT PROVIDE POLLEN AND NECTAR FOR PREDATORS**



**MANY NATIVE AND NATIVE LIKE PLANTS  
PROVIDE NECTAR AND POLLEN**



# NATIVE AND NATIVE LIKE PLANTS PROVIDE HABITAT FOR NATIVE ANIMALS



# SOMETIMES THE SIMPLEST SOLUTIONS ARE THE BEST



***THE PROBLEM IS ALMOST NEVER AS BIG  
AS IT SEEMS***



# ***Pest Control Decisions***

- **Do Nothing and Check Back Later**
- **Let Natural Predators do the Control**
- **Evaluate Cost Effectiveness**
- **Use Bio-rational Materials**
- **Spot Treat Affected Areas Only**
- **Chose the Next Least Toxic Chemical**
- **Re-visit and Re-evaluate Condition**



**OH NO! WE GOT BED  
PUGS!**



# ***WHAT IS NEXT***



Herp Alliance

*Nature: The Pot of Gold*

*Don't destroy It!*





**The ~~End~~**

**IPM produces  
a safe,  
healthy,  
attractive yard**

**THE BEGINNING OF AN  
ENVIRONMENTALLY  
SOUND LANDSCAPE**



**FOR MORE INFORMATION CONTACT**

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**MLR**

## **REFERENCES**

**PHOTO OF PAGE FROM REVIEW JOURNAL LAS VEGAS  
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**OPAL SCHALLMO, PESTICIDE TRAINING POWER POINT  
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EXTENSION SERVICE, UNIVERSITY OF FLORIDA.**

**“THE FUTURE OF IPM, SUZANNE WAINWRIGHT-EVANS,  
AMERICAN NURSERYMAN, SEPT. 1, 2007**

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