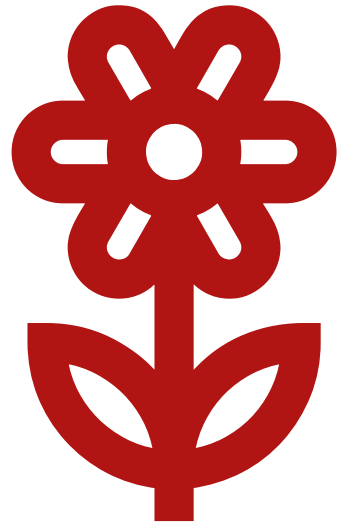




Insects in the Garden

DANIELLE SEKULA – IPM AGENT
TEXAS A&M AGRILIFE EXTENSION

Do you
know your
insects in the
garden?

- ▶ YOU MIGHT ASK QUESTIONS LIKE:
- ▶ WHAT SHOULD I LOOK FOR? WHERE DO I LOOK?
- ▶ WHAT INSECTS ARE GOOD (BENEFICIAL) AND WHICH ONES ARE BAD?
- ▶ WHAT MAKES AN INSECT A PEST?

Pests in the Garden...

- ▶ Main Pests can be divided into the damage they caused:
- ▶ Leaf Chewers (caterpillars, beetles)
- ▶ Flower, fruit and seed feeders (thrips, stinkbugs, plantbugs, leaf footed bugs, fruit flies)
- ▶ Sap suckers (think scale, aphids, psyllids, leafhoppers, whiteflies, mites)

Flea beetles (many species)



Mealybugs

- ✓ **Feed on leaves**
- ✓ **Gregarious**
- ✓ **Form white, cottony masses**
- ✓ **Leaf, or fruit drop**
- ✓ **Plant die back**
- ✓ **Honeydew**
- ✓ **Sooty mold**







Mealybug Control

Insecticidal Soap

Neem Oil

Horticultural oils

Azadirachtin

Imidacloprid

Simply pruning helps, and discarding in bags to physically throw them away to avoid reinfestation



✓ ***Cryptolaemus sp.***
✓ **Lacewings**



Catepillars

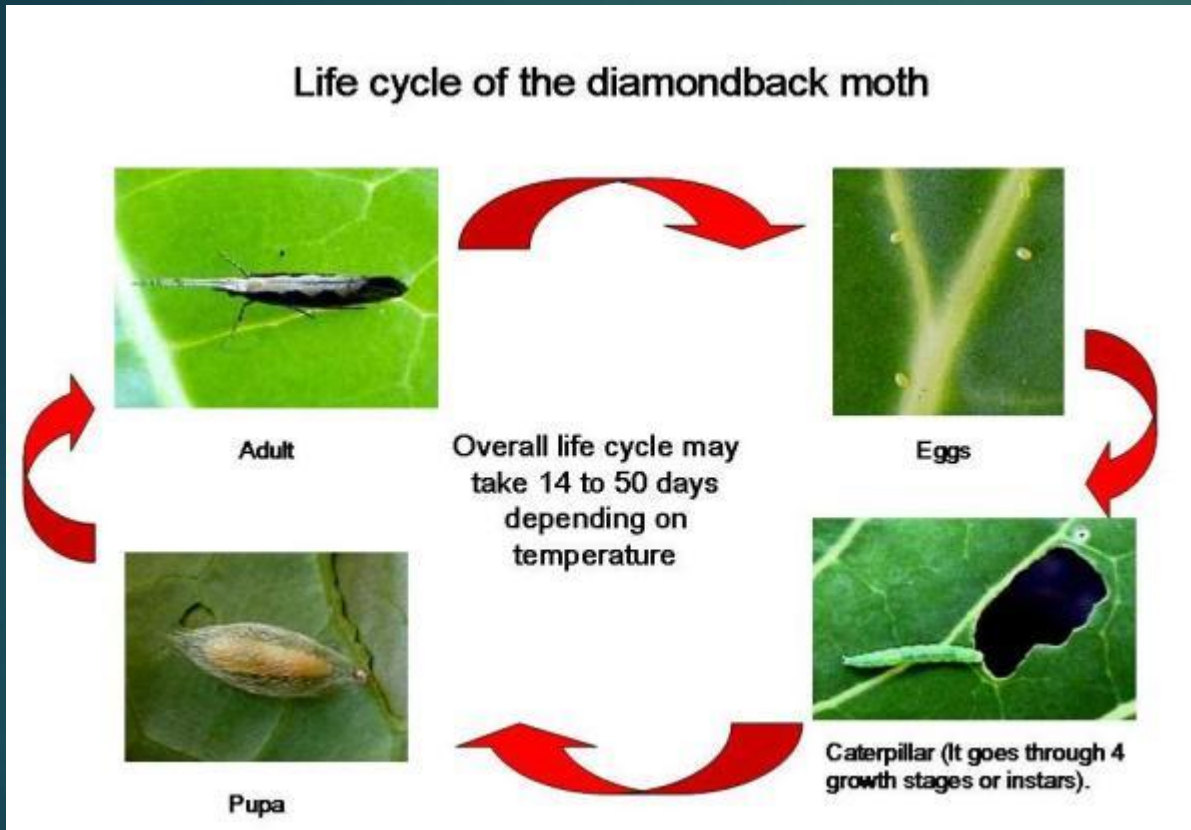
Caterpillars

- ✓ **Loopers**
- ✓ **Cutworms**
- ✓ **Tent caterpillars**
- ✓ **Armyworms**
- ✓ **others**



Foliage feeders

Diamond Back moth



- Adults are grayish moths, about 1/3 inch long, females can lay 150-250 eggs before they die
- larvae, which rarely exceed 1/3 inch, are pale yellowish-green with fine, scattered, erect black hairs over the body
- they wiggle actively when disturbed
- pupa is in a gauzy sack so thin and loosely spun that it hardly conceals the pupa about 3/8 inch long

Diamondback moth damage & control

DAMAGE:

- Presence of silk on the plants
- Skeletonized foliage except for the leaf veins
- Damage starts with the lower leaves first
- Damage to the under leaf surface, leaving the upper epidermic intact, creating a window-pane effect
- Problems with the head formation in cabbages, broccoli, and cauliflower



Diamondback moths primarily attack plants in the cruciferae family, such as:

Broccoli
Brussels sprouts
Cabbage
Chinese Cabbage
Cauliflower
Collard
Kale
Kohlrabi
Mustard
Radishes
Turnips

CONTROL Methods USED:

- *Bacillus thuringiensis* (Bt) early stages..
- alternate between kurstaki and aizawa strains and other pesticides.
- Neem oil is a good option to rotate into your control regime.
- These pests enjoy white mustard and rape, both of which can be trap crops.
- Or simply walked your garden and kill them, haha... also kill them before you plant transplants

Cabbage Looper



See difference between DBM and looper, Diamond back larvae feed partway through the leaf and have a forked tail.



Tomato/tobacco hornworms

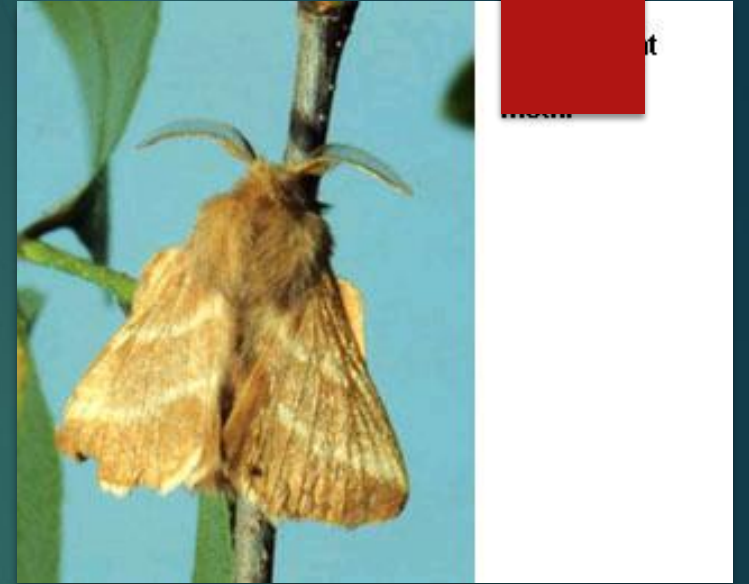
They feed at night and hide in foliage
during the day



These tobacco hornworms, and their close cousins the tomato hornworms, are destructive pests in the veggie patch.

Tent Caterpillars

- ▶ Spring & early summer
- ▶ Tent or no tent
- ▶ Adult moths are short lived



Fall Webworm

- ▶ Deciduous trees
- ▶ Summer or Fall
- ▶ Feed inside web
- ▶ Prune out
- ▶ Bt sprays
- ▶ Natural enemies
- ▶ Leave alone



Caterpillar Control – Home Use

Azadirachtin (neem extract)

- Some formulations are OMRI-listed for organic use.

Bacillus thuringiensis-

- Apply when damage first occurs
- Some formulations are OMRI-listed for organic use.

Bifenthrin

Cyfluthrin

Pyrethrins

- Some formulations are OMRI-listed for organic use.

Spinosad A&D

- Some formulations are OMRI-listed.



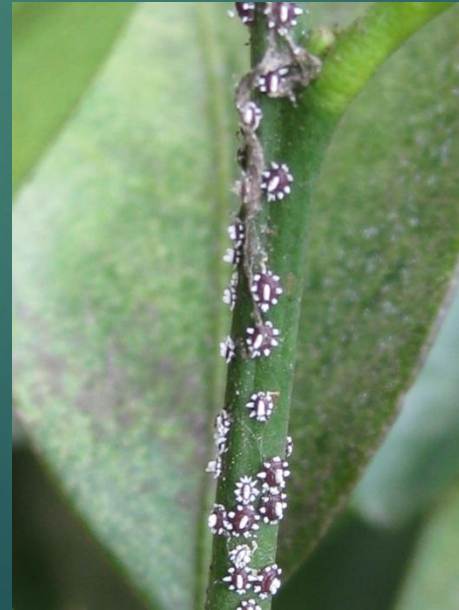
Scale.



Scale Insects

- ▶ Crawler stage mobile 1st instar, last instars and adults immobile
- ▶ Toxins and honeydew
- ▶ Infested plants wilt, foliage turns yellow, sooty mold grows
- ▶ Use sucking mouthparts to feed mostly on trees, shrubs or perennial plants

Scales



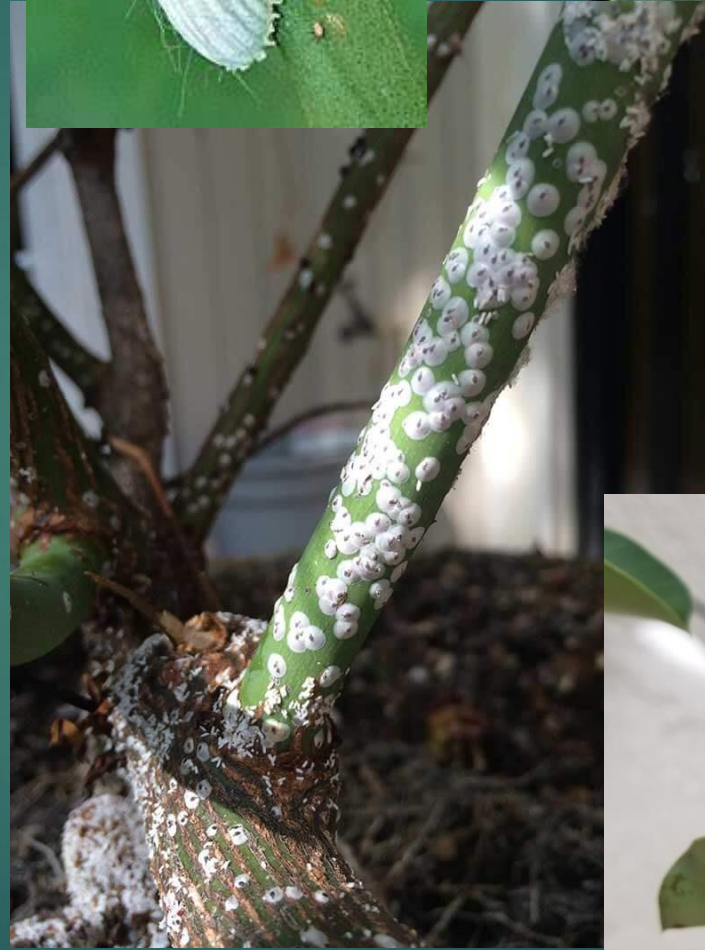
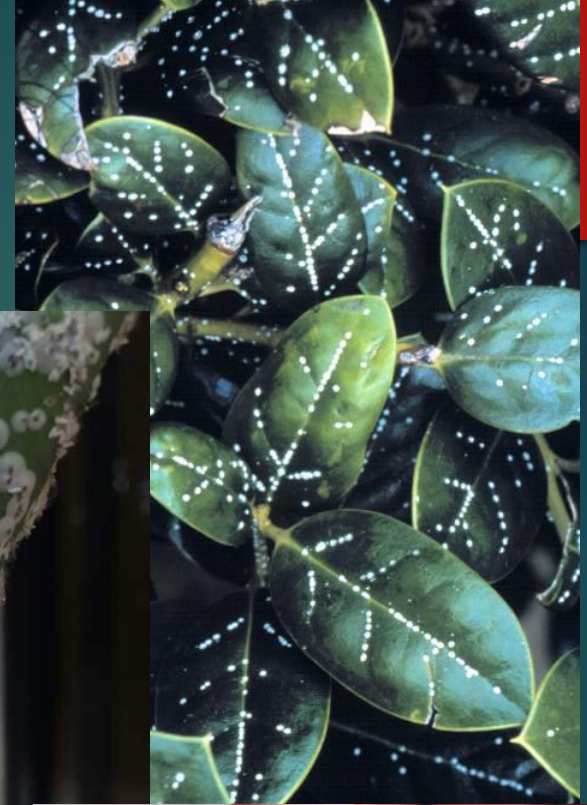
Euonymus Scale

- **Feed on Euonymus**
- **Adult female is oyster shell shaped**
- **Crawlers appear in May**



Scale Control

- ✓ **Soil applied imidacloprid in spring**
- ✓ **Neonicotinoid (imidacloprid, thiamexthiam)**
- ✓ **Organophosphate**
- ✓ **Pyrethroid**
- ✓ **IGR**
- ✓ **Insecticidal oils**
 - Dormant oils in winter**
 - Summer oils - crawlers**
 - Mineral/Petroleum oil for hard scales**
- ▶ **Natural enemies**
- ▶ **Pruning and throwing away cuttings to avoid reinfestations, physically remove them from property**





Using Horticultural Oils/ Neem oil

With contact sprayed oils, insects are suffocated rather than being killed by a toxic material.

Oils are also effective against aphids, whiteflies, and spider mites, yet they are less harmful than other insecticides to beneficial predatory insects.

Horticultural oils are often called narrow-range, superior, or supreme oils, and are specially refined petroleum products.

***Oil sprays are best used when the temperature is mild, between 45 and 85°F, at least 24 hours in advance of rain.

*** Down here that's never the case we are always above 90°F
So I recommend spray in the evening to avoid burn

Stinkbugs, Leaf footed bugs, & squash bugs



Squash bugs

Stinkbugs and Leaf footed bugs

Control of Stinkbugs and Leaf footed bugs:
permethrin, cyfluthrin or
esfenvalerate can be used, hot
pepper wax , Sevin

Habitat and Food Source(s), Damage:
Leaffooted bugs and stinkbugs feed on a
wide variety of developing fruit, including
cotton, oranges, peaches, and tomatoes,
and seeds such as beans, black-eyed peas,
and sorghum. They also feed on the stems
and tender leaves of plants such as
potatoes. Both have sucking piercing
mouth parts that penetrate the fruit and
inject toxins as they feed





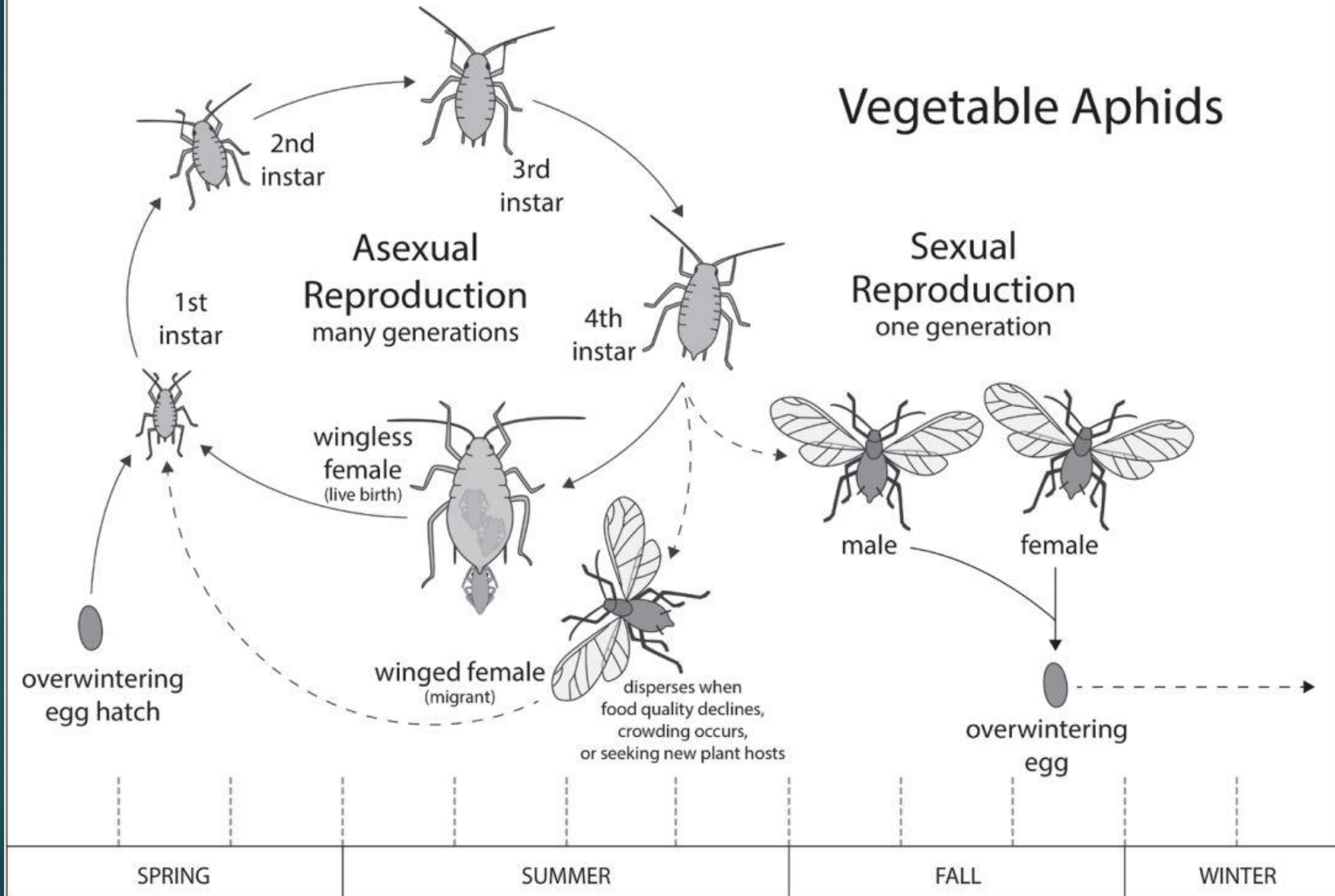
Aphids

Non-chemical Control

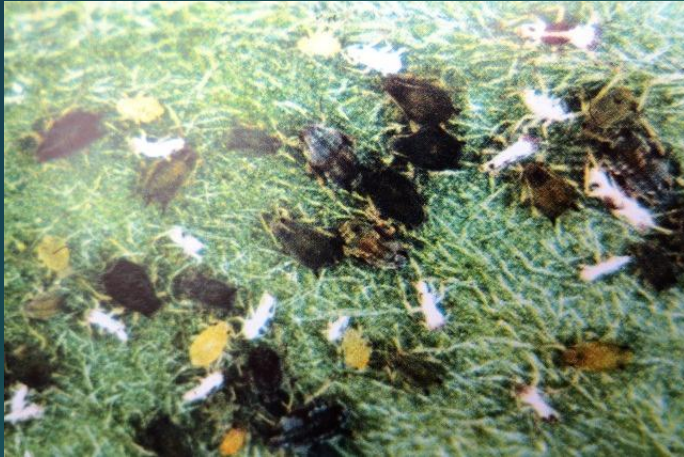
- ✓ **Preserve beneficials**
- ✓ **Release beneficials?**
- ✓ **Water sprays**
- ✓ **Manually wipe**
- ✓ **Use of barriers**



Vegetable Aphids



Aphids





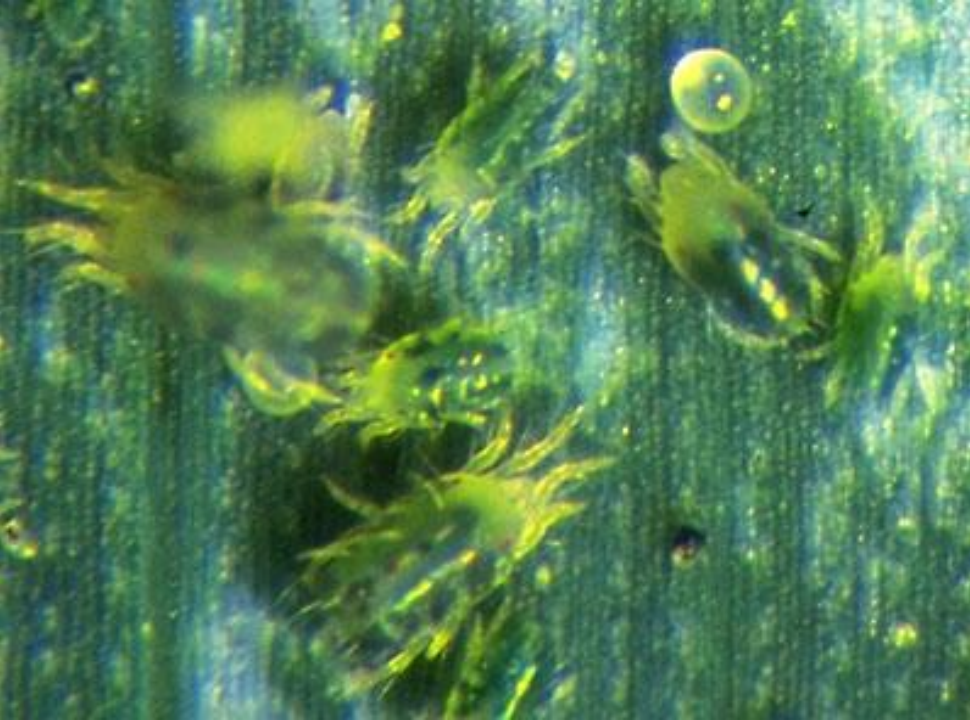
Aphid Control

- ✓ **Oils (Neem, hort)**
 - ▶ Horticultural oils - SunSpray Ultra-Fine Spray Oil[®]
 - ▶ Neem oil
- ✓ **Insecticidal soaps**
 - Soaps 1-2% solution - Safer[®], M-Pede[®]
- ✓ **Imidacloprid**
 - ▶ Bayer Advanced Garden Rose and Flower Insect Killer (Imidacloprid)
 - ▶ Merit[®], Marathon[®] (Imidacloprid)
- ✓ **Insect Growth Regulators**
 - Azadirachtin – Azatin[®] XI, Neemazad[®]**
 - Kinoprene - Enstar AQ[®], Enstar II[®]**



Spider Mites





Spider Mites

- ▶ Many generations per year
- ▶ Eggs are laid on lower leaves of plants
- ▶ Webbing associated with large colonies
- ▶ Very short life cycle
- ▶ Difficult to kill eggs
- ▶ Early control crucial before population build up
- ▶ Generally will find in abundance on very dry hot years (drought and stressed plants)
- ▶ Most common is the two spotted spider mite



Beneficial Insects

- ▶ Ladybird beetles
- ▶ Lacewings
- ▶ Predatory Mites
- ▶ Syrphid fly/larva
- ▶ Soldier beetles
- ▶ Preying mantids
- ▶ Spiders
- ▶ Parasitic Wasps



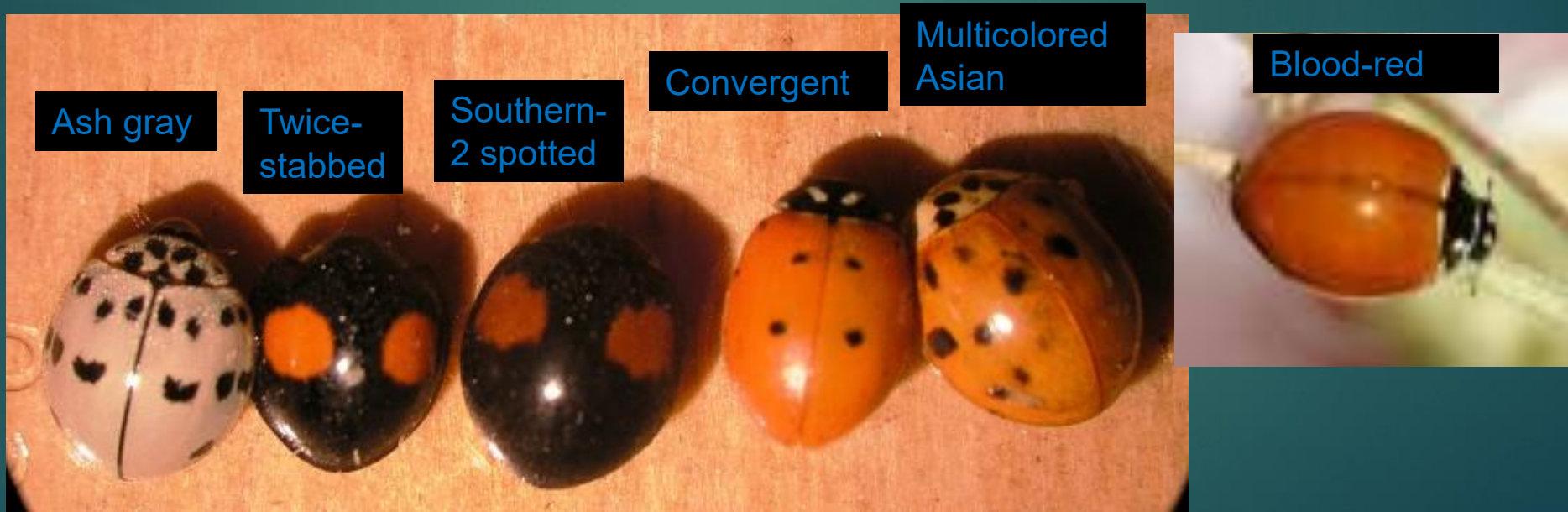
Soldier beetle





Lacewings

Coccinellids are the most important
biocontrol agents of psyllid in TX,
and of many other pests in the RGV



Larva can eat 400 aphids, adults eat up to 5,000 aphids
Female can lay 1500 eggs in 100 day lifetime

Predators feeding on Aphids

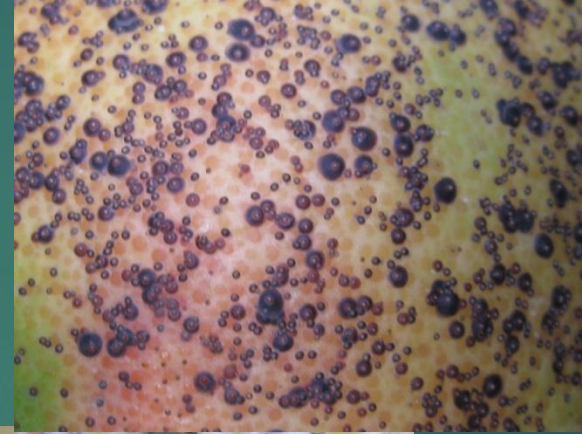
Lady bug : *Harmonia axyridis* (larva on left and adult on the right)



Lady bug : *Scymnus* (larva on the left and adult on the right)



Twice stabbed Ladybird Beetle Eating Florida Red Scale



Asian Citrus Psyllid



- ACP is a small brown insect that reproduces on new flush growth of citrus and its relatives (Rutacee)
- Eggs are laid on new flush growth where nymphs feed and develop
- Nymphs go through 5 developmental stages before they emerge as adults

Life Cycle of Asian citrus psyllid



2-5 days



5 Nymphal stages



❖ Life cycle completed in 15 to 47 days depending on temperature

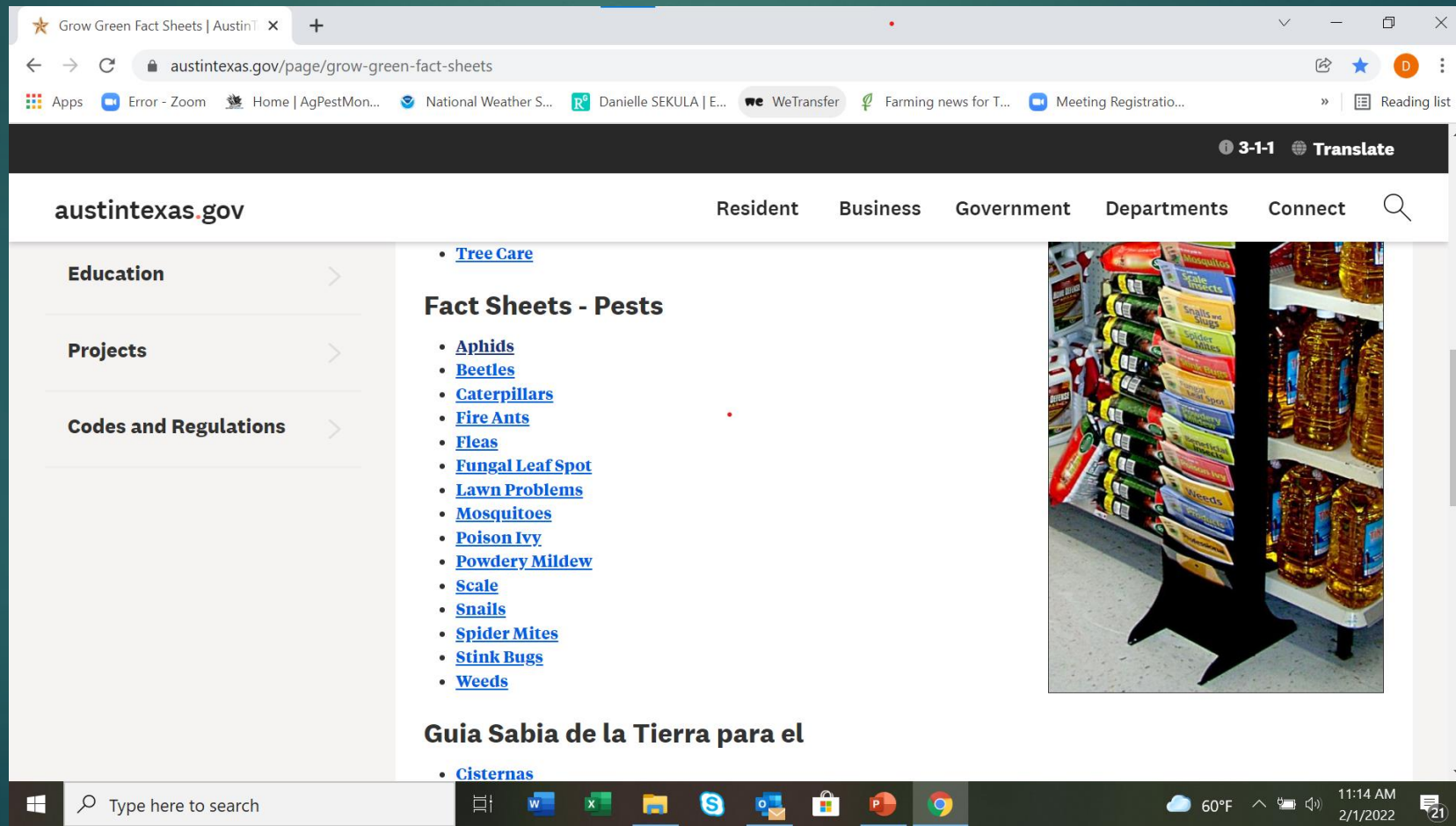
Psyllid
infestation

Biocontrol of Psyllid



Helpful website with Factsheets on different insects and products you can use

► <https://www.austintexas.gov/page/grow-green-fact-sheets>





earth-wise guide to

Aphids



aphid, magnified

description

Tiny (1/16-1/8") insect with soft body, long legs and antennae; cornicles or "tailpipes" on tip of abdomen; 250 species; reproduce quickly; attack new growth or underside of leaf

infestation

Suck sap from plants and excrete clear, sticky "honeydew" that often grows black, sooty fungus that blocks sunlight from leaves; feeding can stunt growth, deform and discolor leaves, or cause them to drop prematurely; usually attack new growth; some aphids transmit plant diseases

attack

- Bedding plants
- Crape myrtles
- Hibiscus
- Oaks
- Oleanders
- Pecans
- Roses
- Vegetables

identify before you buy

Need help diagnosing a plant problem? Call the Texas AgriLife Extension Service at 512-854-9600 and ask for the master gardener desk or email them at travismg@ag.tamu.edu

Least-Toxic Solutions

- Monitor often for early detection and to determine if control is needed; natural predators may make treatment unnecessary
- For minor infestations, spray host plants with water at high pressure to dislodge aphids
- Introduce ladybugs or lacewings and other beneficial insects to your landscape after infestation has been identified – for best results follow release instructions carefully; best to release in an enclosed area
- Use sticky barriers to prevent ants from tending aphids and protecting them from natural predators
- Help control aphids with insecticidal soaps and horticultural oils
- Use a row cover to physically keep the aphids off vegetable crops while allowing air, light and water exchange
- Use natural or slow-release fertilizer to avoid excessive new growth
- Most aphids are host-plant specific and usually don't move to other species

If You Must Use a Pesticide...

- Avoid systemic pesticides on vegetables and edible plants. Systemic pesticides are taken up by the plant and make its tissues and fluids toxic to foliage-feeding insects
- Non-systemic pesticides must be applied to all infested plant surfaces for best results, because they must come into direct contact with the insects
- Avoid applying broad spectrum pesticides - they destroy beneficial insects as well as pests and leave trees or shrubs unprotected if pests return
- Apply only to plants specified on the label - some formulations injure tender ornamental plants and new growth
- Mix according to directions and apply only recommended dosage
- Several pesticide applications may be needed for control at 7-10 day intervals, or as instructed by the product label
- Avoid overuse of chemicals – many pests have become resistant to certain pesticides



aphids and associated sooty mold

product toxicity comparisons

Evaluation of active ingredients only; does not include toxicity information on inert or "other" ingredients.

Toxicity/Threat:

○ low ○ low to moderate ● high ● highest NA not applicable
? unknown toxicity ⚡ banned by EPA 🌱 earth-wise

Hazards:



note	Product Name	active ingredient(s) / concentrations	human toxicity acute	human toxicity chronic	aquatic life	birds, bees, pets	soil mobility	environmental persistence
🌱	Bonide® Hot Pepper Wax Ready-to-Use	Capsaicin and related Capsaicinoids 0.184%	○	?	○	○	?	?
🌱	Concern® Insect Killing Soap	Fatty acid soap 1%	○	?	○	○	○	○
	Garden Safe® Fungicide 3-in-1 Ready-to-Use	Extract of neem oil 0.9%	○	?	○	○	○	○
	Orange Guard® Home Pest Control	D-limonene	○	?	○	○	○	○
	Green Light® Neem Concentrate	Clarified hydrophobic extract, of Neem Oil 70%	○	?	○	○	○	○
	Maxide® Dual Insect Killer	Thiamethoxan 0.20 Lambda-cyhalothrin 0.04%	○	○	○	○	○	○
	Green Light® Neem II Ready-to-Use	Pyrethrin 0.02% Piperonyl butoxide 0.20% Clarified hydrophobic extract of neem Oil	○	○	○	○	○	○
	Ortho® Orthenex® Garden Insect & Disease Control Concentrate	Acephate 4%, Triflorine 3.25% Fenbutatin oxide 0.75%	○	○	○	○	○	○
	Concern® Multi-Purpose Insect Killer	Pyrethrins 0.24% Potassium salt of fatty acid 20%	○	○	○	○	○	○
	Bayer Advanced™ PowerForce® Mosquito Killer Plus Outdoor Fogger	Tetramethrin 0.15% Permethrin 0.15% Piperonyl butoxide 0.75%	○	○	○	○	○	○
	Bayer Advanced™ Complete Insect Dust Ready-to-Use	Permethrin 0.25%	○	○	○	○	○	○
	Bayer Advanced™ Tree & Shrub Insect Control Concentrate	Imidacloprid 1.47%	○	?	○	○	○	○
	Bonide® All Seasons® Horticultural Spray Oil	Petroleum oil 98%	○	?	○	○	?	?
	GardenTech® Sevin® Ready-to-Use 5% Dust Bug Killer	Carbaryl 5%	○	○	○	○	○	○
	Bayer Advanced™ 2 in 1 Systemic Flower Care	Diazinon 0.1%	○	○	○	○	○	○

The City of Austin and the Texas AgriLife Extension Service provide this information as a comparative reference only. Listing of specific product trade names does not constitute endorsement of its use. Many other pesticides and pesticide products are available and may be suitable for use other than those listed in these tables. **Check labels carefully as trade names and active ingredients may change.**

Products rated by Grady J. Glenn, Ph.D., B.C.E., of the Pesticide Safety Education Program, Texas AgriLife Extension Service. The rating system was developed by Philip Dickey of the Washington Toxics Coalition.

why grow green?

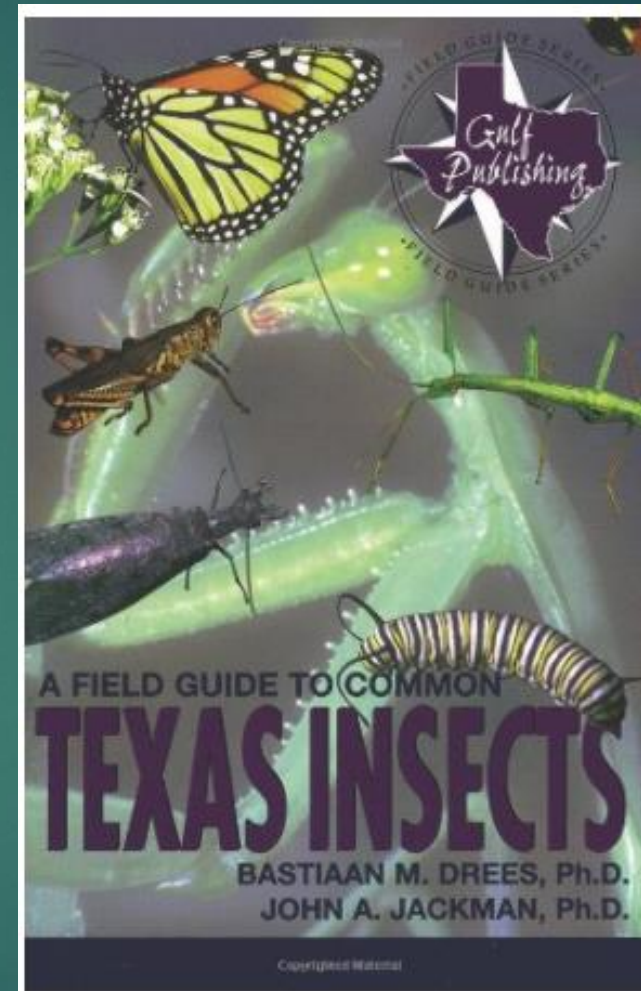
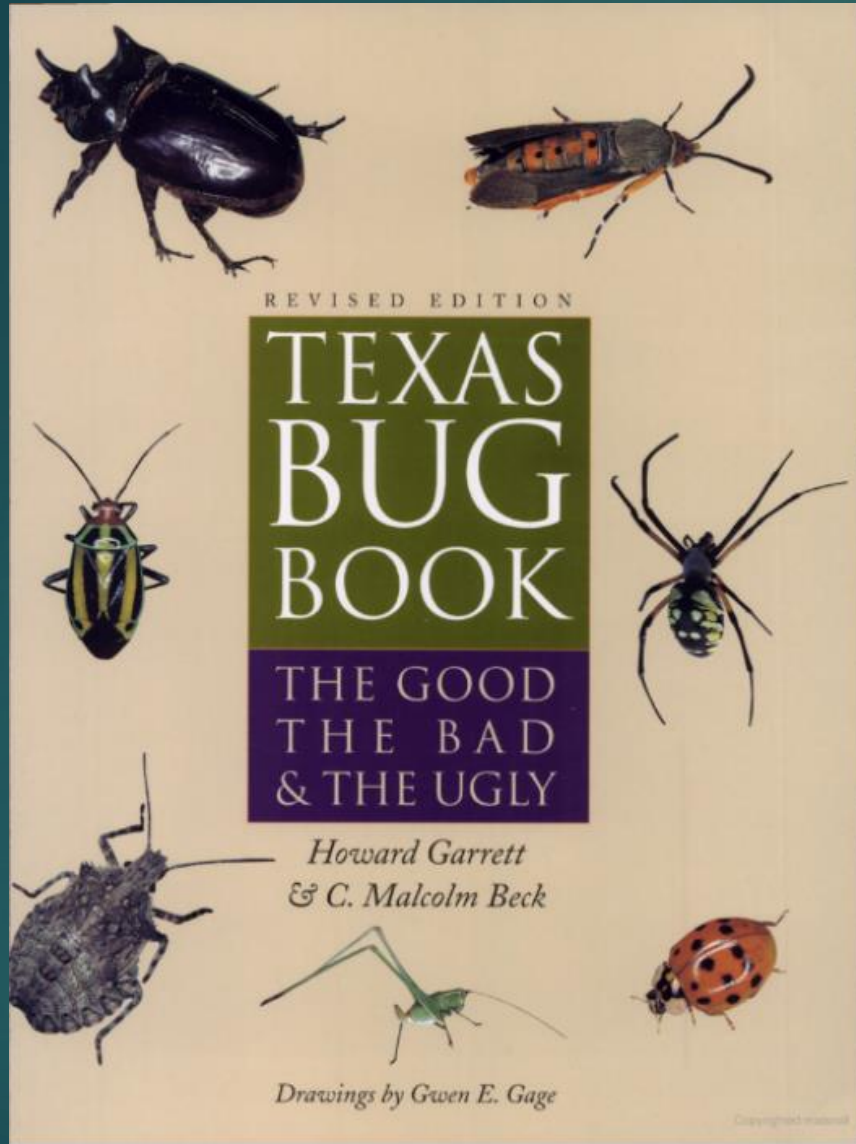
The Grow Green program is based on Integrated Pest Management (IPM) principles that encourage the LEAST TOXIC approach to pesticide and fertilizer use. The goal is to reduce the amount of landscape chemicals that degrade water quality when they run off into waterways or leach into our groundwater.

Grow Green is a partnership between the City of Austin Watershed Protection Department and Texas AgriLife Extension Service. Call 512-974-2550 or 512-854-9600 for more information or visit our website at www.growgreen.org.

City of Austin
WATERSHED PROTECTION
512-974-2550

TEXAS A&M
AGRI LIFE EXTENSION
512-854-9600

Books I recommend to have on hand...



Thank you so much for your time and attention

For other Pest concerns or questions please
do not hesitate to contact your local LRGV
IPM agent.

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