

Common Landscape Scale Insects of Texas

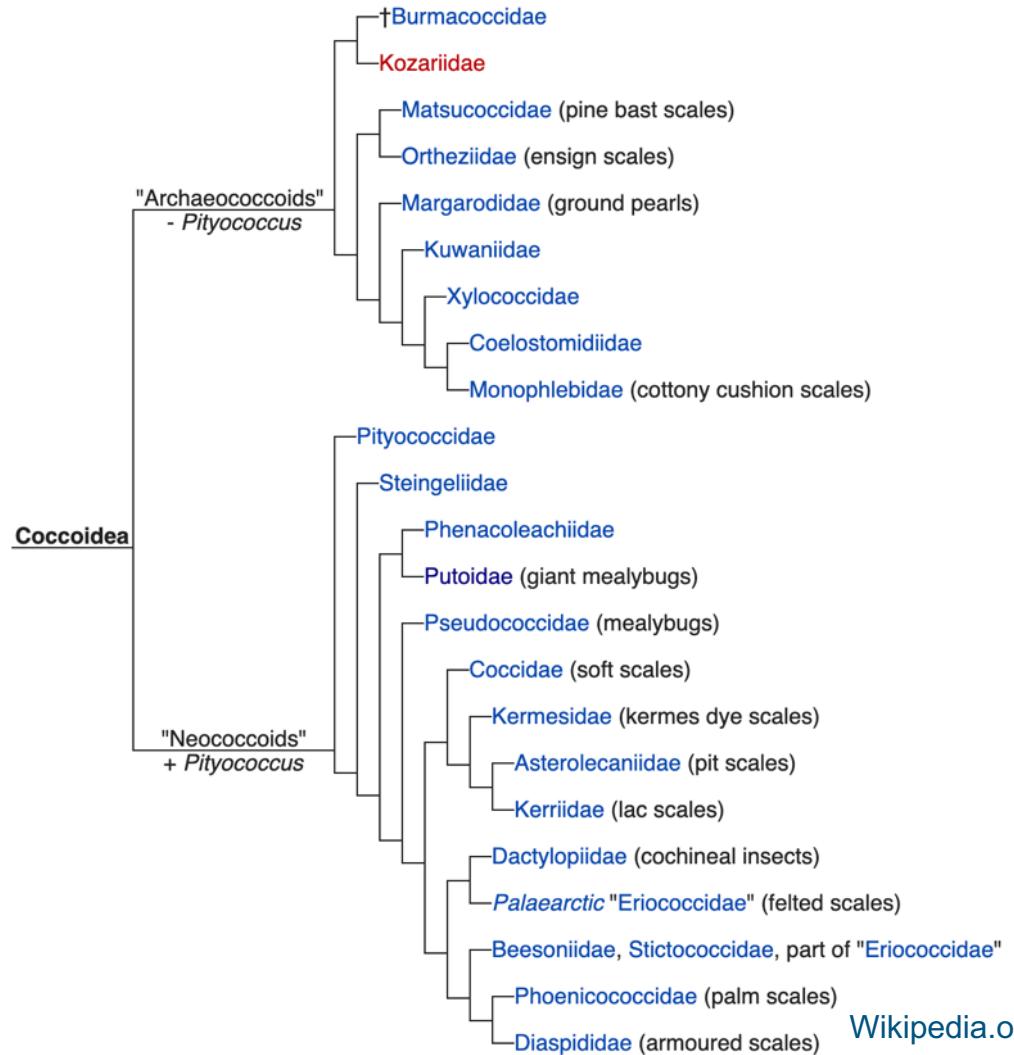
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Sixleggeddaggie.com



Scale (Coccoidea) | Wha

- ▶ Hemipterans (true bugs)
- ▶ Sucking mouthparts
- ▶ Produce honeydew*
- ▶ Sexual dimorphism
- ▶ Produce waxy coat



* Not all species

Scale (Coccoidea) | What are they?

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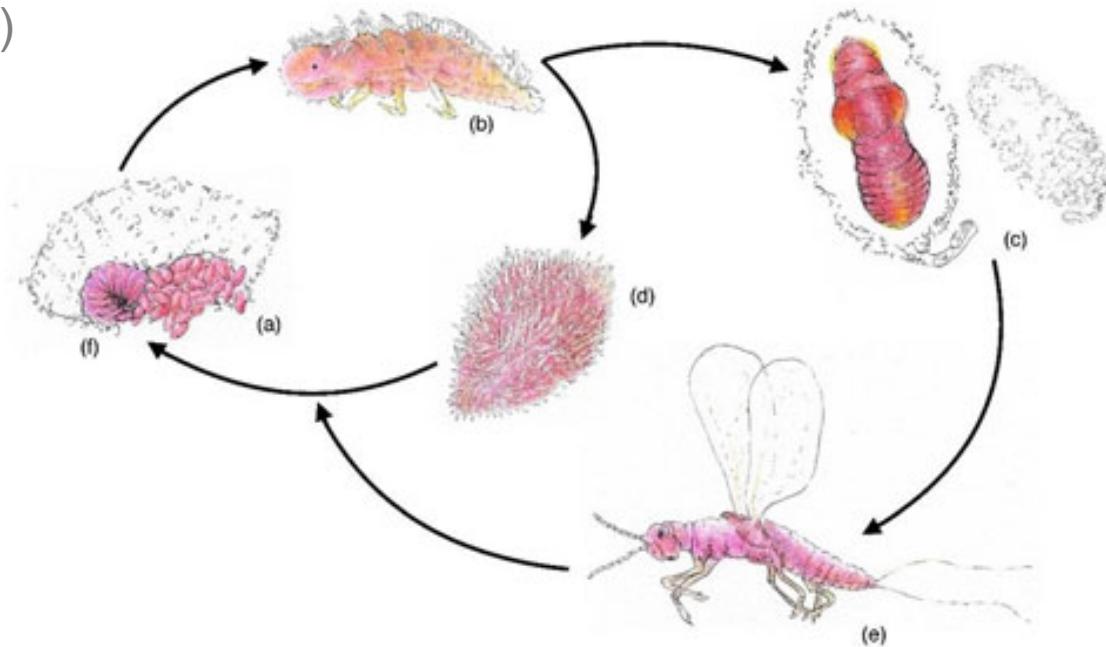
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Scale (Coccoidea) | All Bad?

- ▶ Dye
- ▶ Biological Control

Illustration of cochineal collection in José Antonio de Alzate y Ramírez, *Memoria sobre la naturaleza, cultivo, y beneficio de la grana...*, (Essay on the Nature, Cultivation, and Benefits of the Cochineal Insect), 1777, colored pigment on vellum
(photo: [Newberry Digital Collections for the Classroom](#), Edward E. Ayer Manuscript Collection, VAULT Ayer MS 1031).



Scale (Coccoidea) | All Bad?

- ▶ Dye
- ▶ Biological Control

Dactylopius coccus on prickly pear
Used by American Indians to make crimson dye to paint missionary buildings, particularly in the San Antonio area



Scale (Coccoidea) | All Bad?

- ▶ Dye
- ▶ Biological Control



Rembrandt van Rijn, Portrait of a couple as Isaac and Rebecca, known as *The Jewish Bride*, about 1665–69, oil on canvas, 121.5 × w 166.5 cm (Rijksmuseum, Amsterdam)

Scale (Coccoidea) | All Bad?

- ▶ Dye
- ▶ Biological Control

Dactylopius opuntiae on
opuntia; biological control in
Kenya



Vahe Martirosyan, Flickr, Some rights reserved

Scale (Coccoidea) | Main Categories

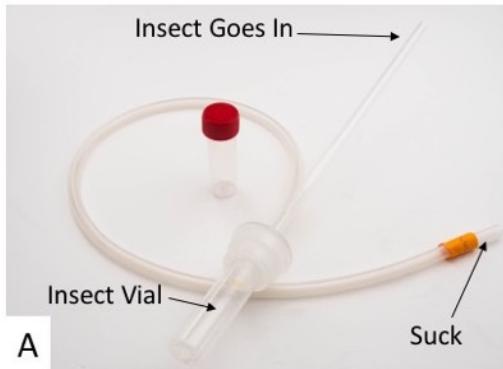
Soft/Felt Scale

- produce thin, waxy/powdery outer layer
 - cannot be separated from rest of the body
- produce honeydew

Hard/Armored Scale

- hard shield-like cover
 - not attached to body of the insect
- do *not* produce honeydew

Monitoring | Tools of the Trade



Monitoring | Tools of the Trade

“Headband magnifier”



\$17 on Amazon

Monitoring | Tools of the Trade

Macro Lens kit for Phone



Monitoring | Tools of the Trade

Macro Lens kit for Phone



\$130 from shopmoment.com



Monitoring | Tools of the Trade



Roll over image to zoom in

TEXAS A&M
AGRILIFE
EXTENSION

Monitoring | Tools of the Trade

Double-sided sticky tape



EXTENSION

Monitoring | Tools of the Trade

Double-sided sticky tape



Common Landscape Scale Insects of Texas

- ▶ Crapemyrtle bark scale
- ▶ Cycad aulacaspis scale
- ▶ Tea scale
- ▶ False oleander scale
- ▶ Euonymous scale
- ▶ Obscure scale
- ▶ Oystershell scale
- ▶ Wax scales
- ▶ Cottony cushion scale
- ▶ Brown soft scale
- ▶ San jose scale



Crapemyrtle bark scale

North Amer. First sighting:
2004, Northern Texas

Now found in:
TX, OK, LA, AR, NM, TN, GA,
AL, MS, NC, SC, VA, and WA

Originally from:
Asia
[Acanthococcus lagerstroemiae]
(Hemiptera: Eriococcidae)

Crapemyrtle

The Call

Richardson, TX (2004)

Photo: Mike Merchant

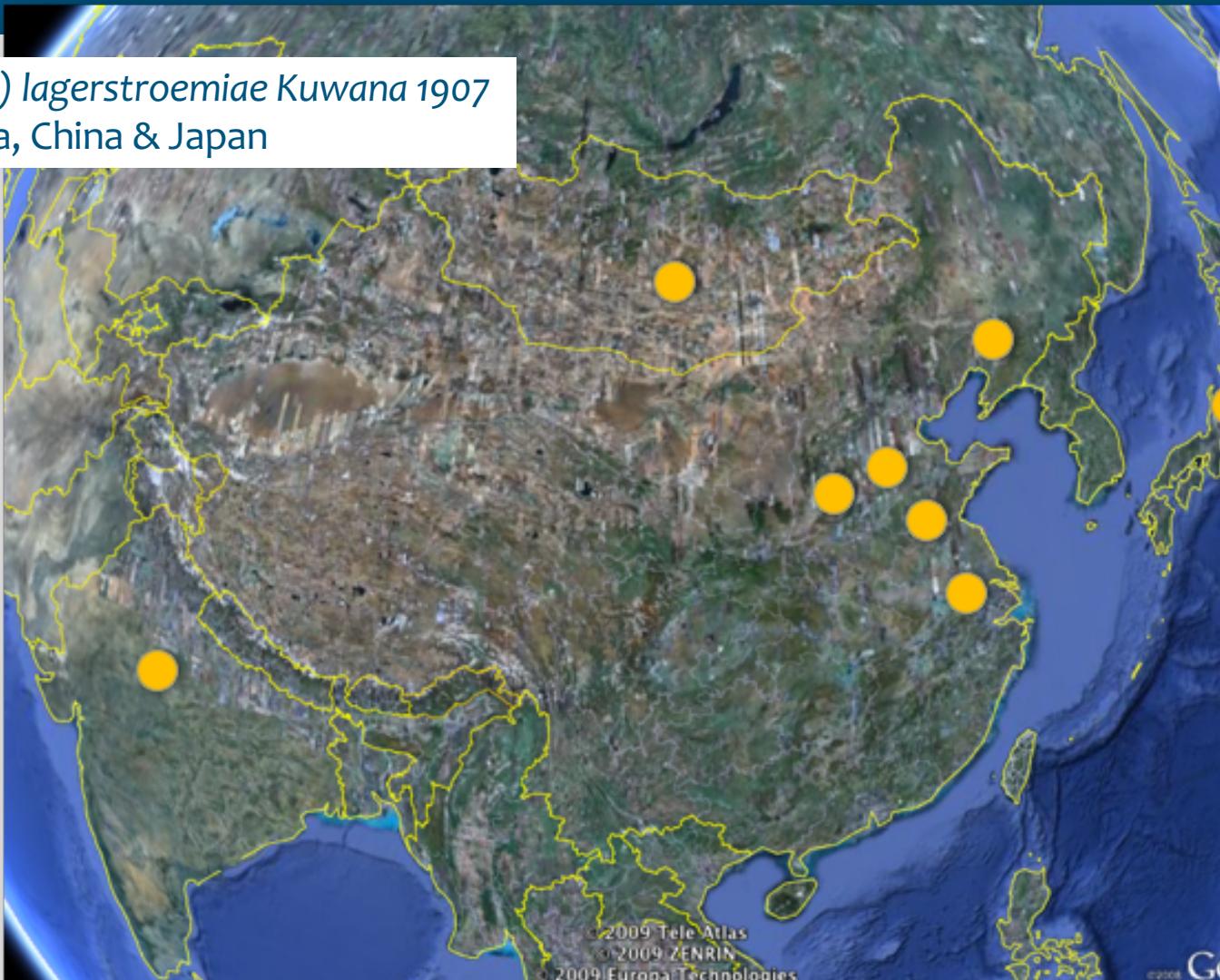


Acanthococcus azaleae ?

Photo: Mike Merchant

Acanthococcus (=Eriococcus) lagerstroemiae Kuwana 1907

Distribution: Inner Mongolia, China & Japan





Beijing Botanical Garden November, 2013

Acanthococcus lagerstroemiae ?

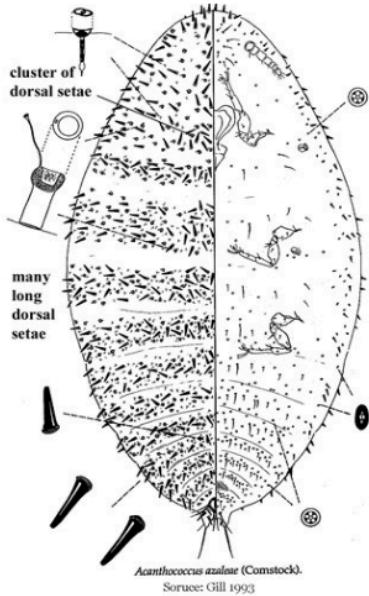


Figure 4. Illustration of *Eriococcus* (=*Acanthococcus*) *azaleae* from Gill 1993. Note the more numerous and longer setae, and the longer sensorium on F5, compared to *E. lagerstroemiae*. Images USDA/ARS, Greg Evans .

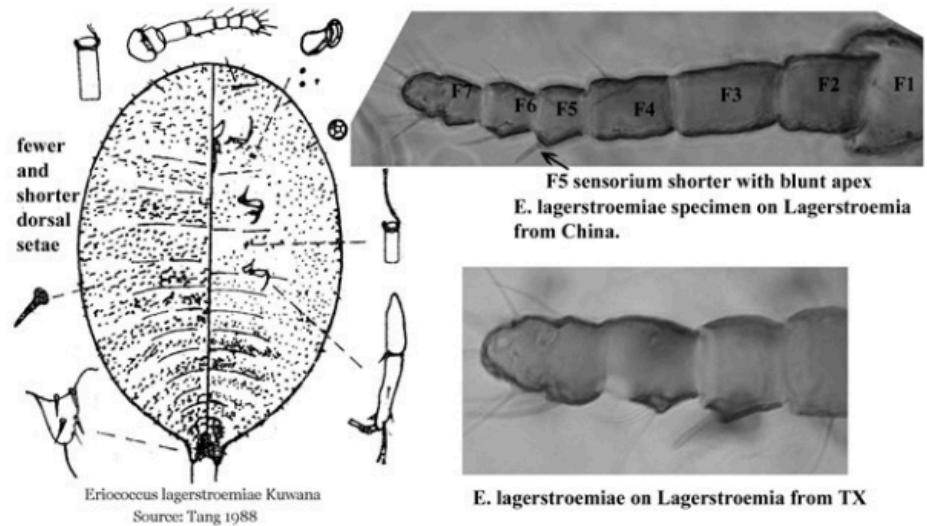
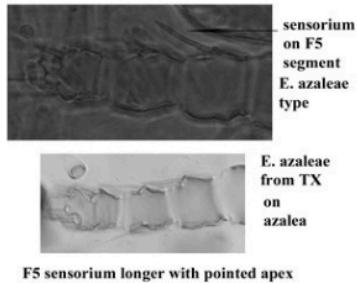


Figure 3. Illustration of *Eriococcus lagerstroemiae* from Tang, 1988 (l). Note shorter sensorium with blunt apex on *Lagerstroemia* specimens from China and Texas (upper and lower right). Images USDA/ARS, Greg Evans .



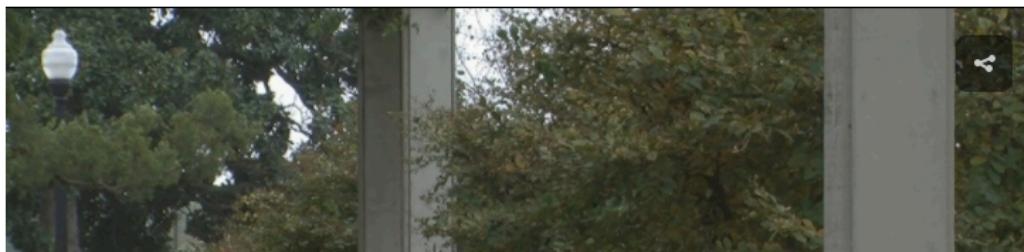
Left Behind: Stories of heroism

The stories behind the items left at the Vietnam Veterans Memorial wall.

[FULL VIDEO](#) | [Gallery:Items left behind](#) | [A means to heal](#)

Invasive species killing Crepe Myrtles in Green Country

by Tyler Butler | Tuesday, November 7th 2017



TRENDING

- 1 A DAY AGO
Police focusing on cellphones in brutal rape, murder of 10-year-old Albuquerque girl



- 2 A DAY AGO
KFC rewards man who noticed they only follow '11 herbs and spices' on Twitter



- 3 AN HOUR AGO
Standoff ends with apparent suicide in Osage County



- 4 A DAY AGO
Muskogee Police identify victim shot to death in their home



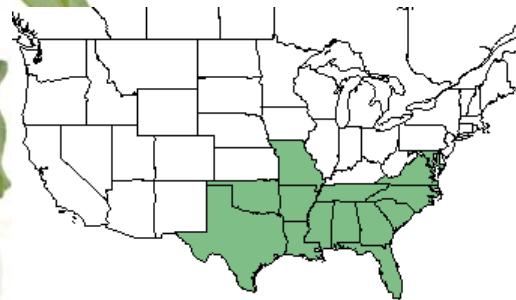
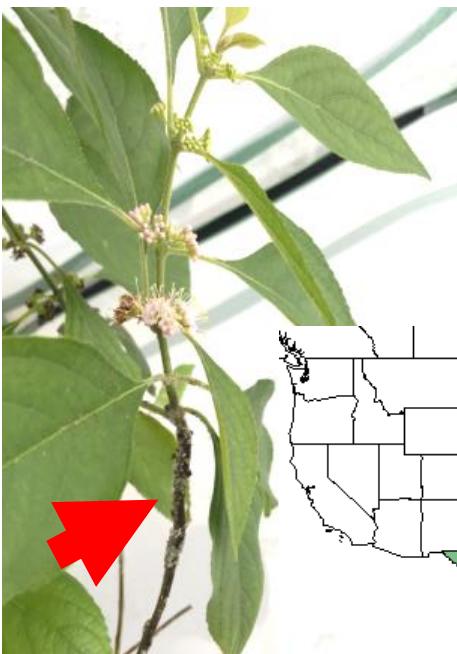
Crapemyrtle bark scale | Beautyberry



Five plant species confirmed to be hosts

American beautyberry

Callicarpa americana L. (Lamiales: Lamiaceae)



Pomegranate

Punica granatum L. (Myrtales: Lythraceae)



Henna

Lawsonia inermis L.

(Myrtales: Lythraceae)



Heimia

Heimia salicifolia Link

(Myrtales: Lythraceae)



Winged loosestrife

Lythrum alatum Pursh

(Myrtales: Lythraceae)



We also have other loosestrifes!

Purple loosestrife

Lythrum salicaria L.
Exotic invasive



European wand

loosestrife
Lythrum virgatum L.

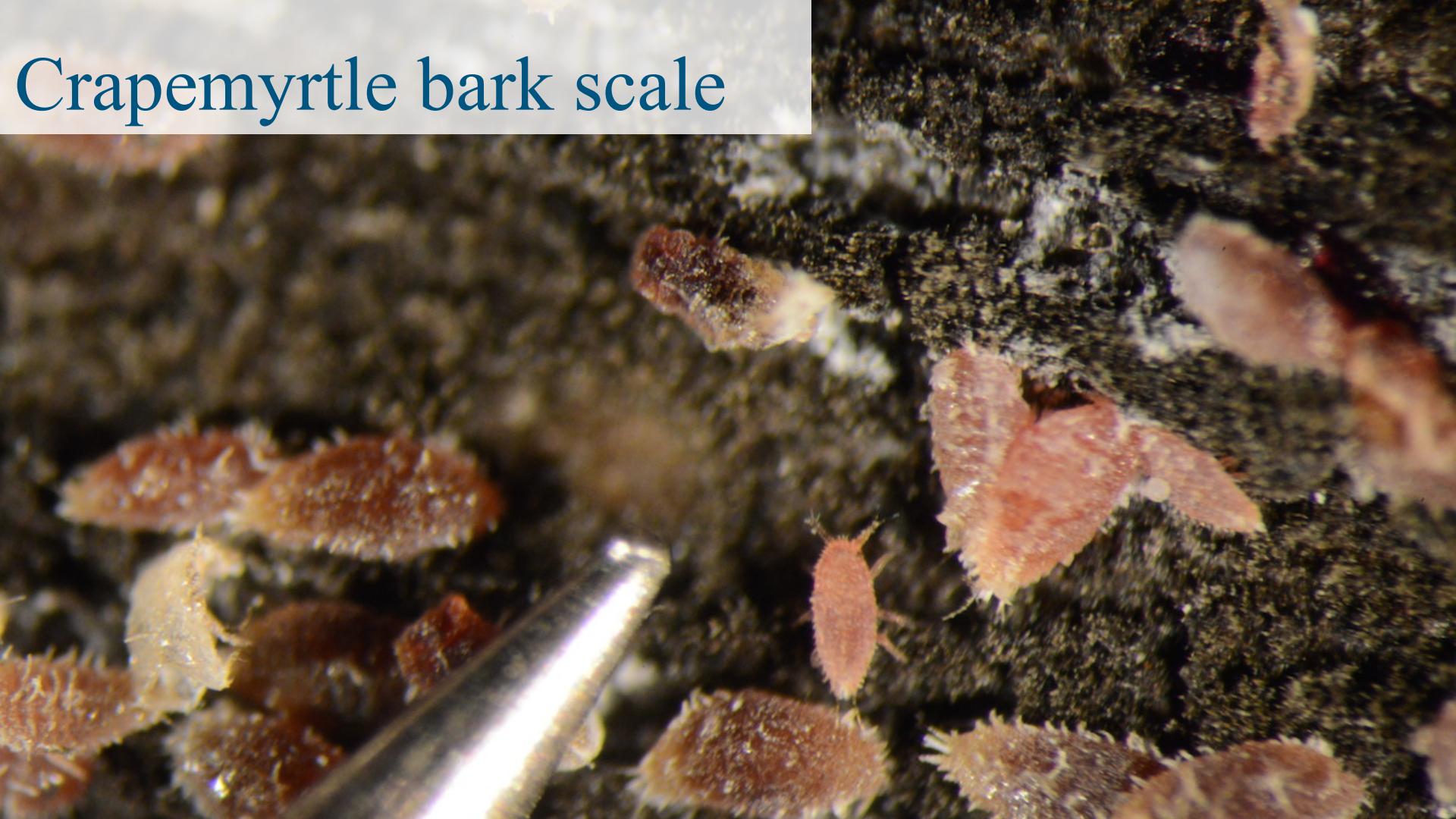


California loosestrife

Lythrum californicum L.



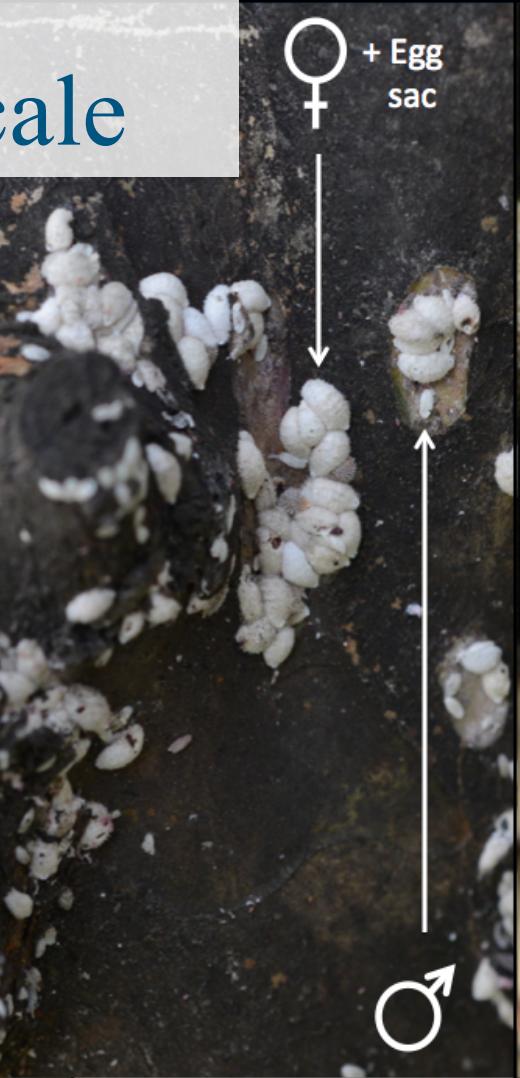
Crapemyrtle bark scale



Crapemyrtle bark scale



Crapemyrtle bark scale



Crapemyrtle bark scale | Nymph (2nd instar)



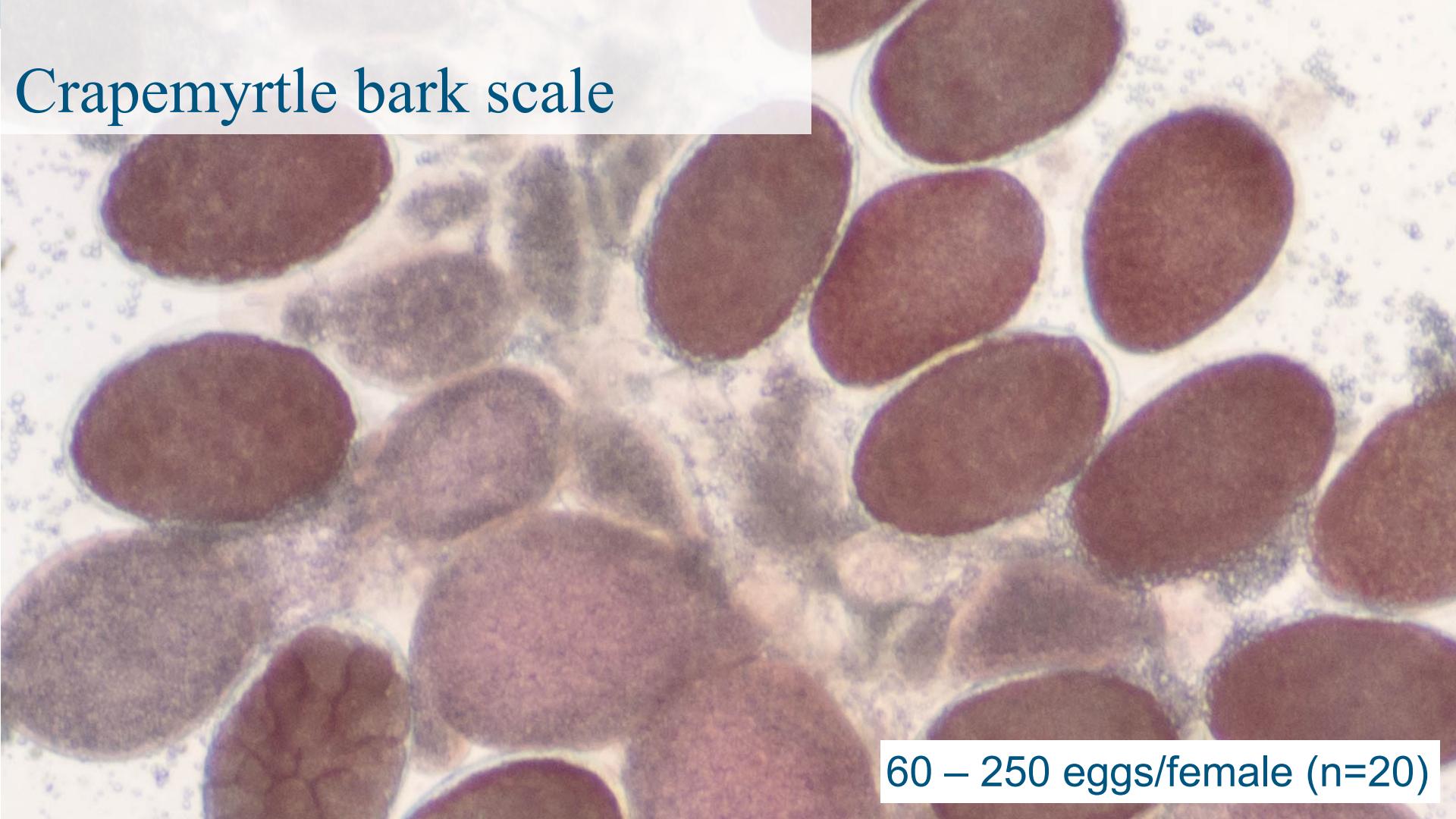
0.5 mm

Photo courtesy of Zinan Wang et al., LSU

Crapemyrtle bark scale



Crapemyrtle bark scale



60 – 250 eggs/female (n=20)

Crapemyrtle bark scale | Male adult



0.5 mm

Photo courtesy of Zinan Wang et al., LSU

Report an Invasive Species Occurrence

Red fields are required.

Species

Pest (?) :

Acanthococcus lagerstroemiae (crapemyrtle bark scale)

Host:

Lagerstroemia indica (crapemyrtle)

Observation Date(?) :

11/12/2017

Location

State:

Select State

County:

Select County

Latitude (?:

Longitude (?:

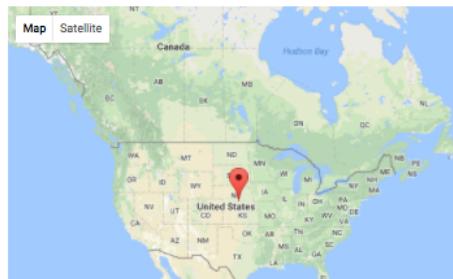
Must be expressed in Decimal Degrees
(XX.XXXX),and DATUM NAD83/WGS84.

Must be expressed in Decimal Degrees
(XX.XXXX),and DATUM NAD83/WGS84.

Location Description/Nearest Address:

[Jump to Point](#)

[Lat/Long Conversion Tools](#)



STOPCMBS.COM

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Images

Image 1:

.jpg

Image 2:

.jpg

Caption:

Caption:



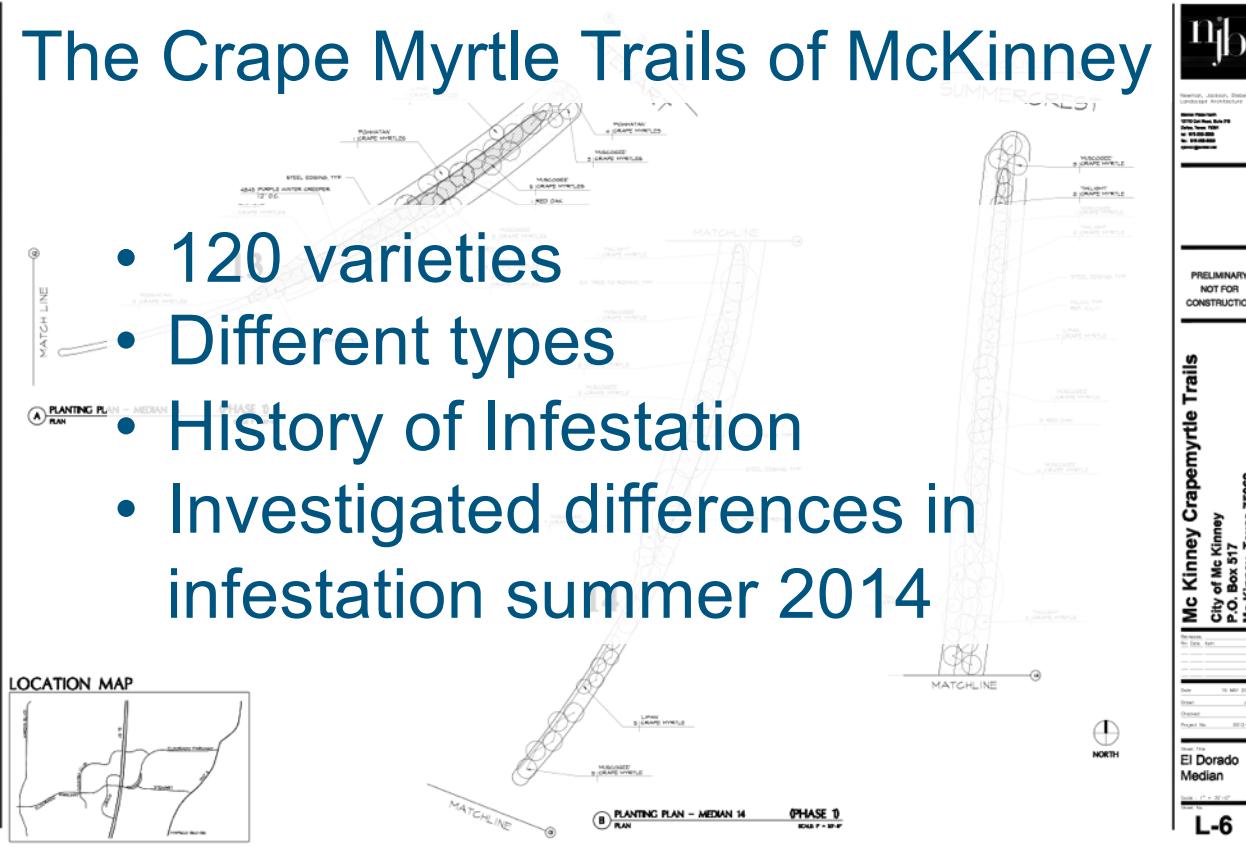
Objectives

1. Cultivar resistance
2. Population dynamics
3. Population control
4. Role of natural enemies
5. Non-chemical control
6. Host Plant Tests
7. Insecticide Residue Analysis
8. Consumer preference surveys

Objectives 1. Cultivar susceptibility

The Crape Myrtle Trails of McKinney

- 120 varieties
- Different types
- History of Infestation
- Investigated differences in infestation summer 2014

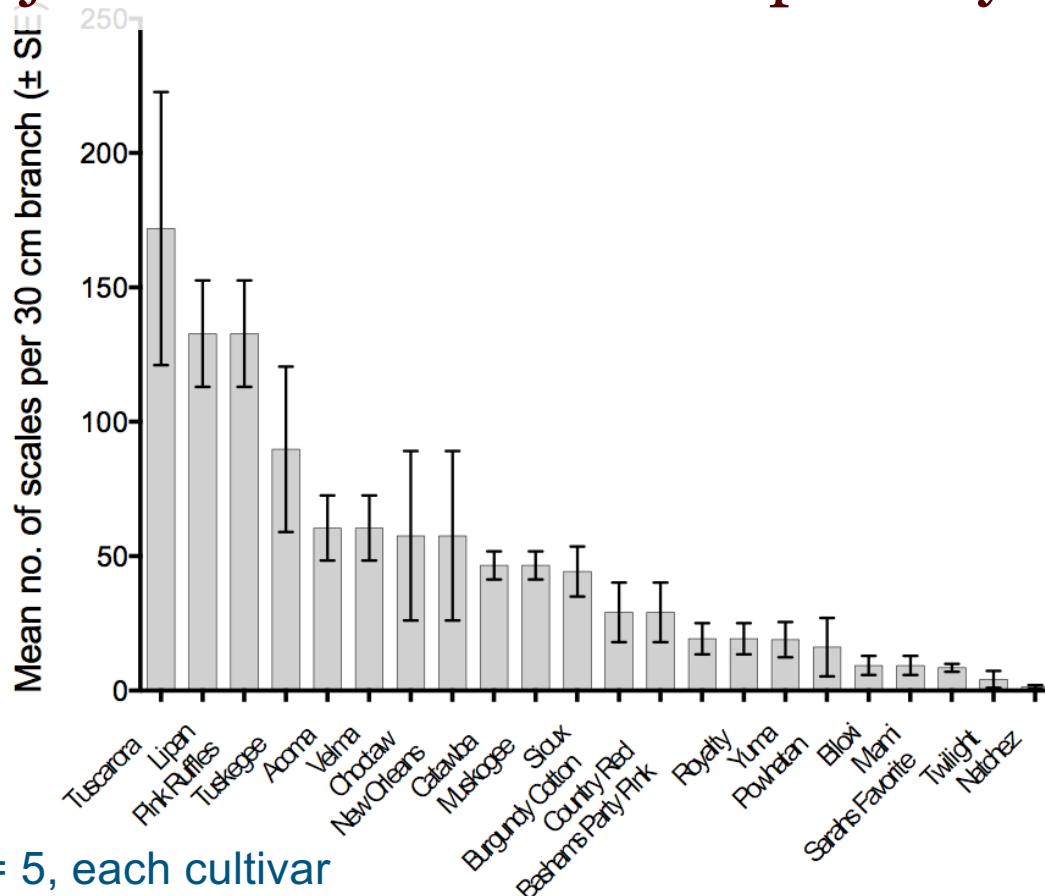


Objectives 1. Cultivar susceptibility



$n = 5$, each cultivar

Objectives 1. Cultivar susceptibility



Objectives 1. Cultivar susceptibility

n = 5, ϵ = 1.00
Mean no. of scales per 30 cm branch (\pm SE)

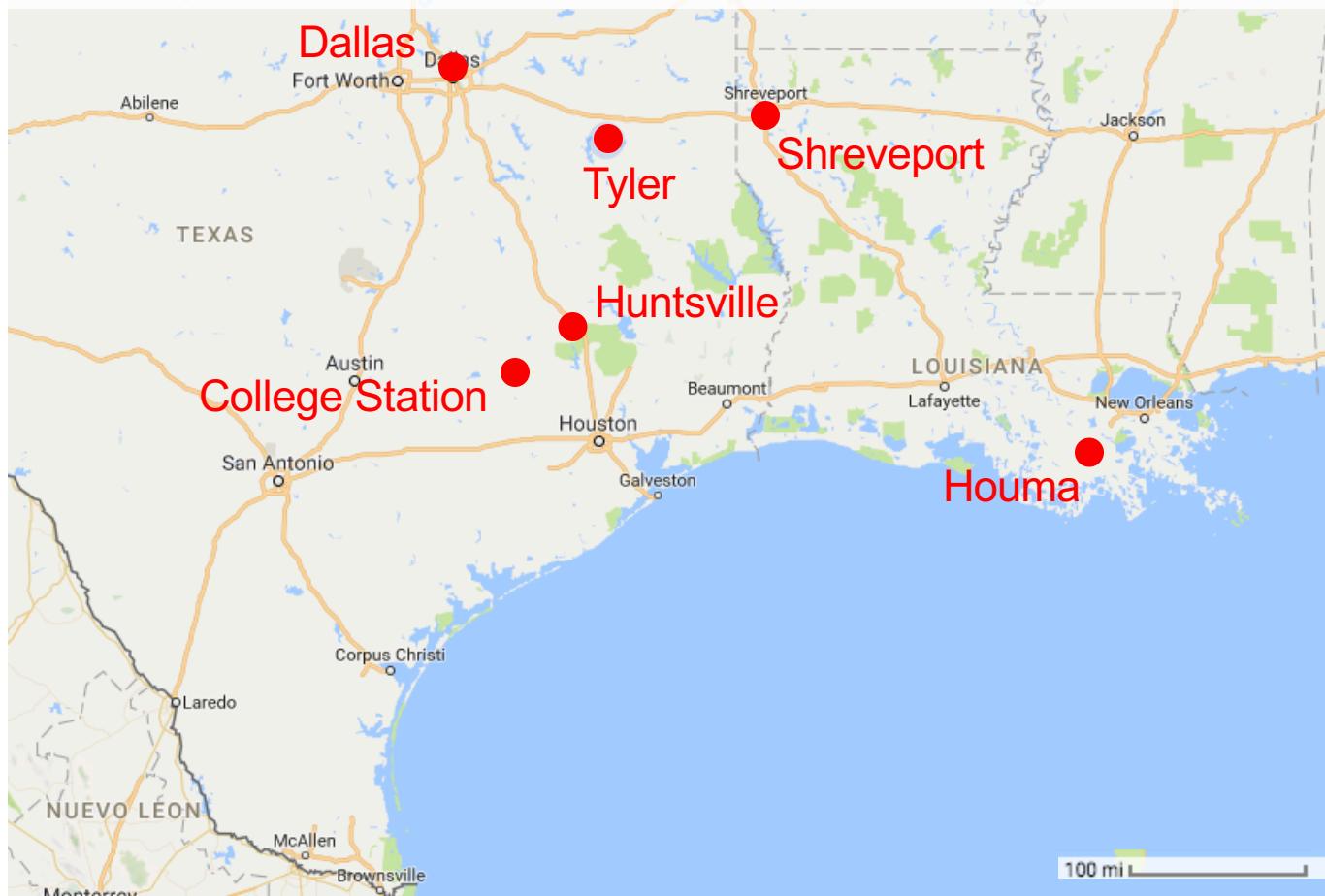


Lowe's

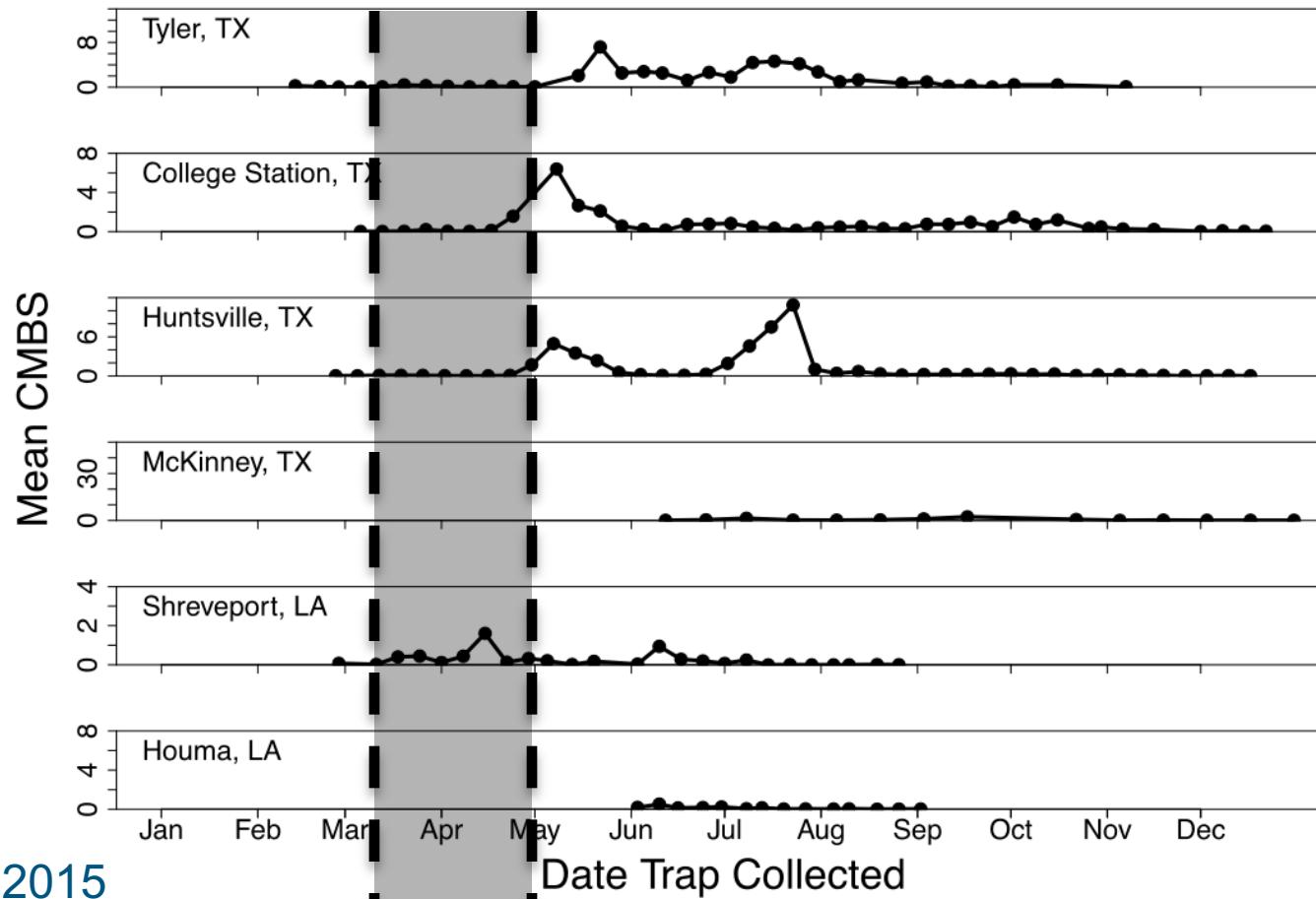
Objectives 2. Population Dynamics



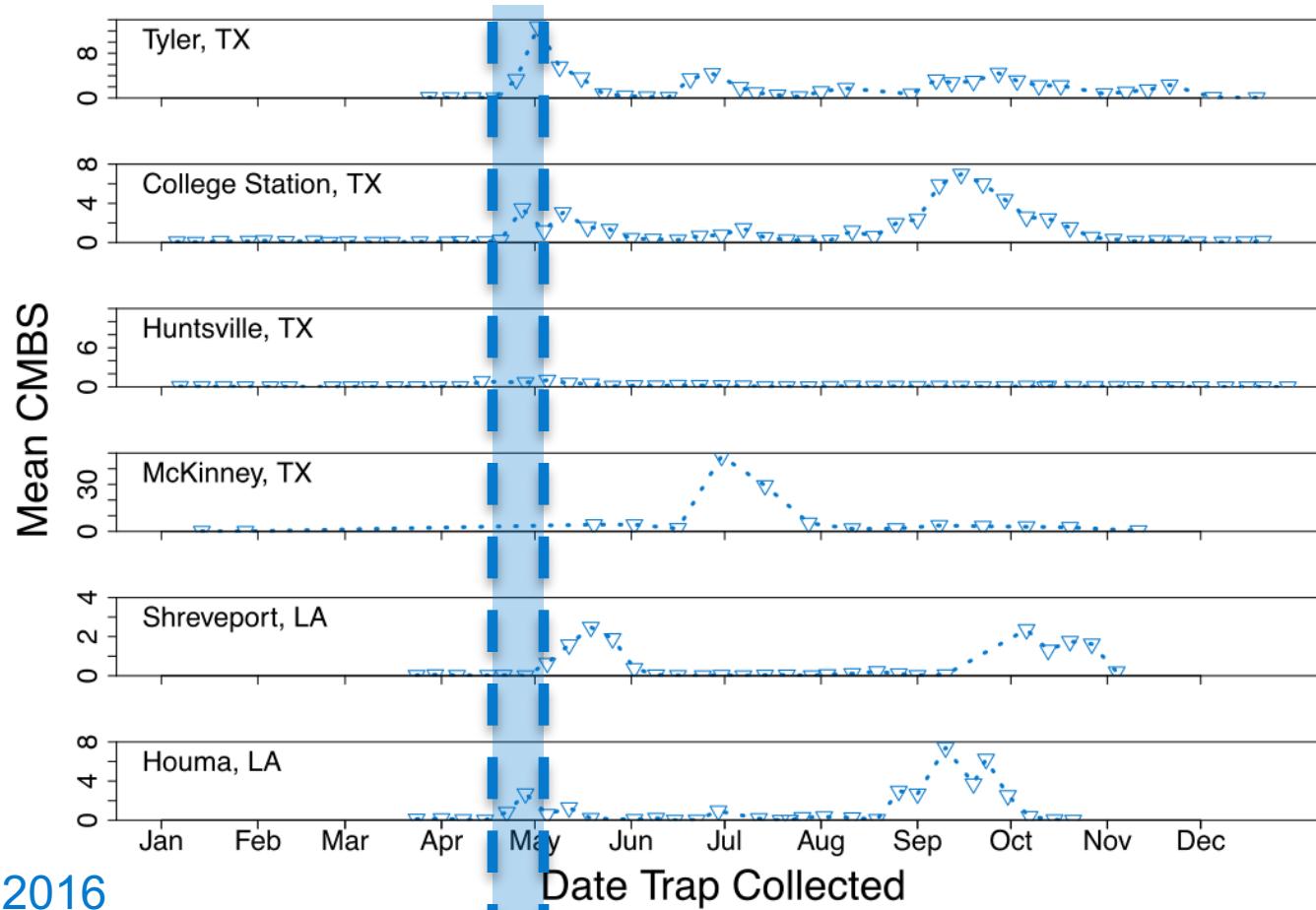
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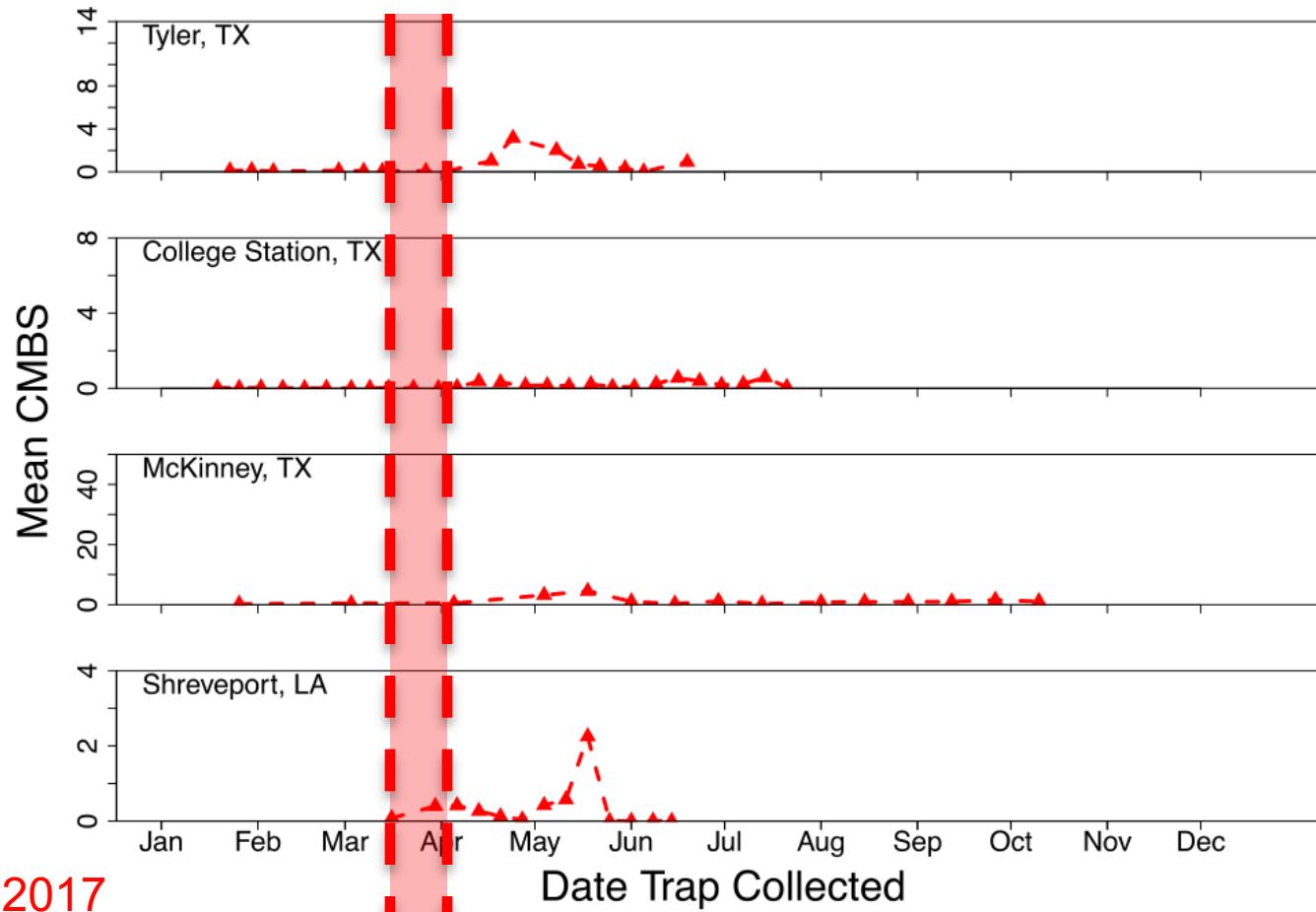
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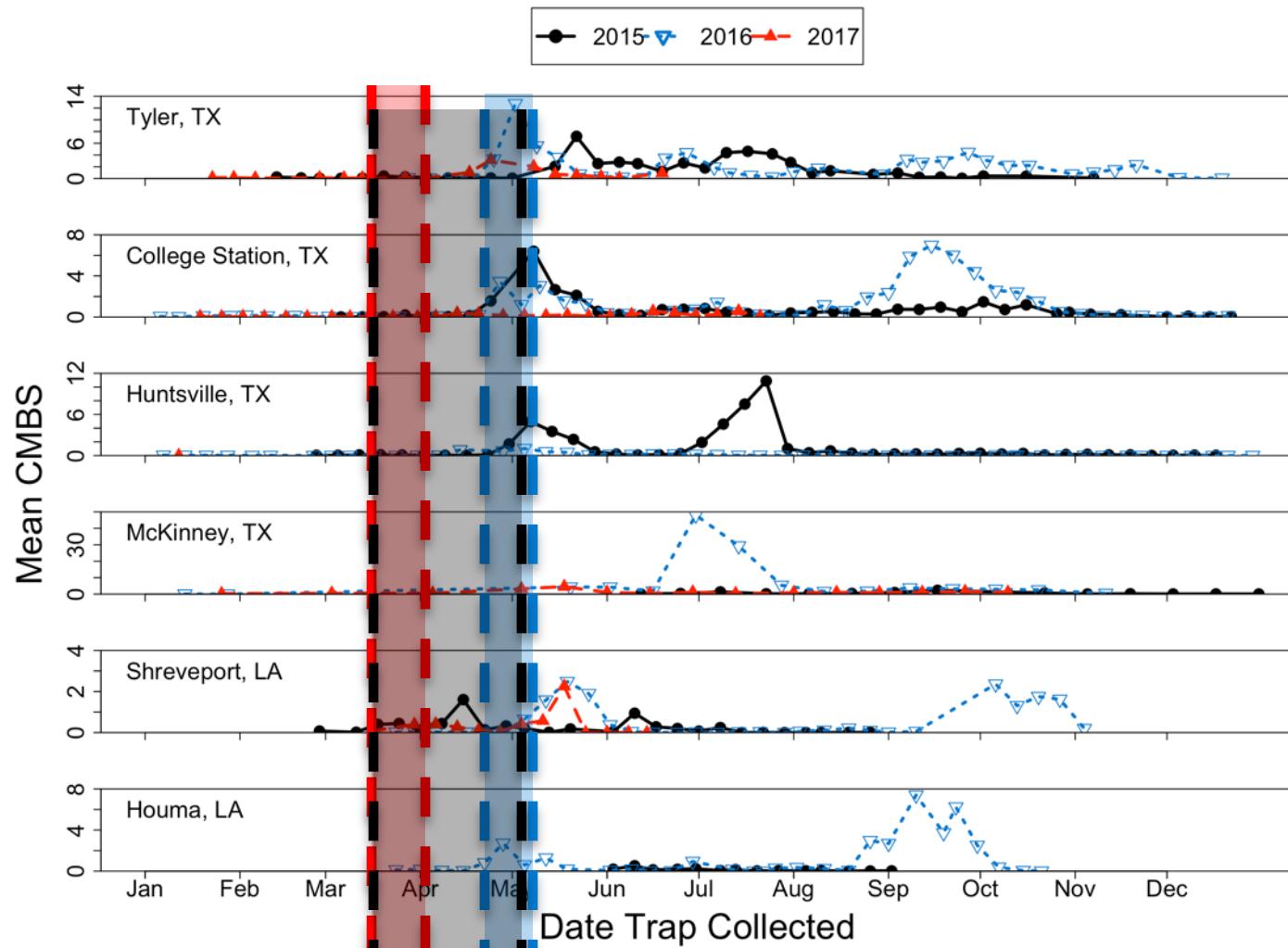


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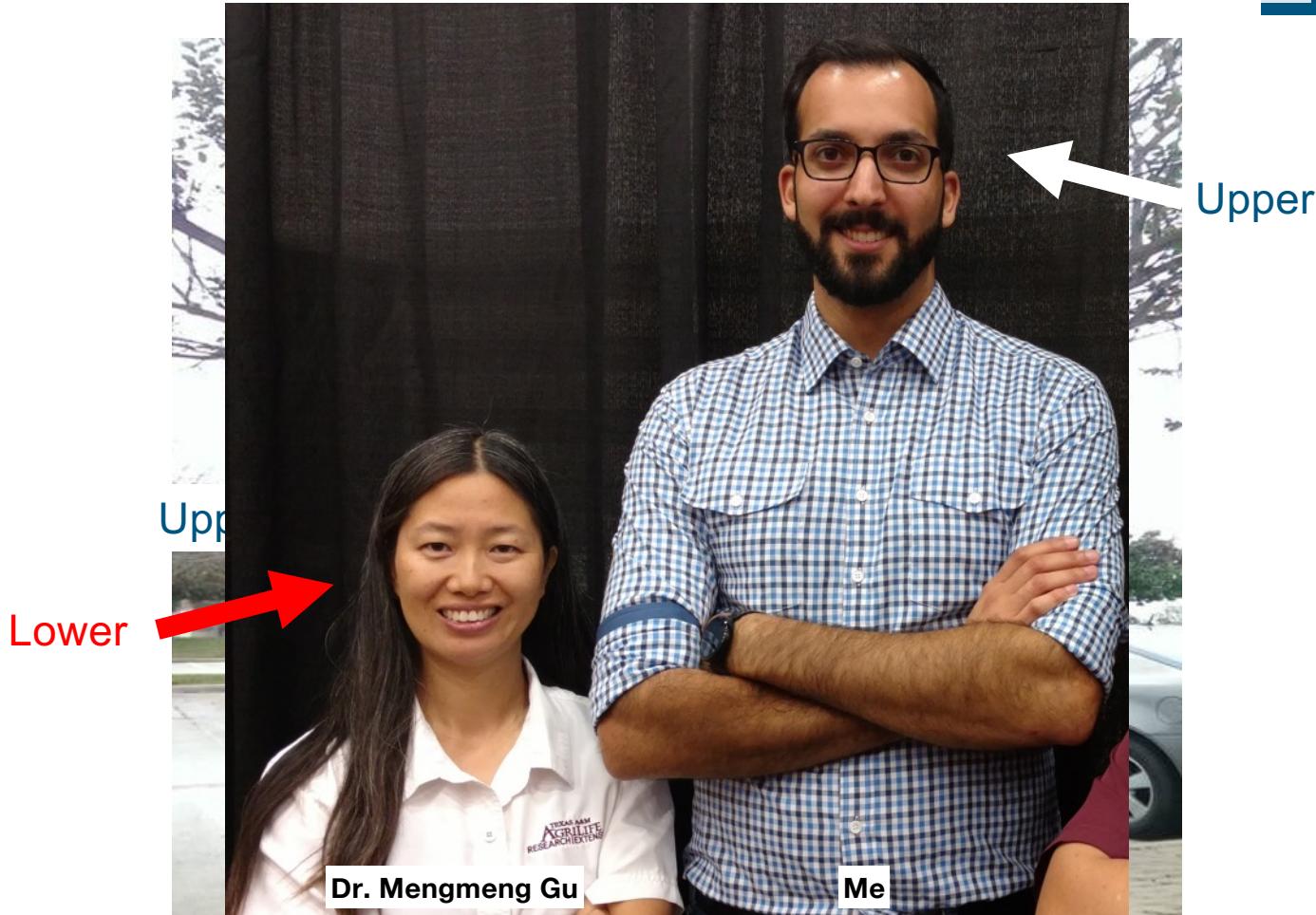


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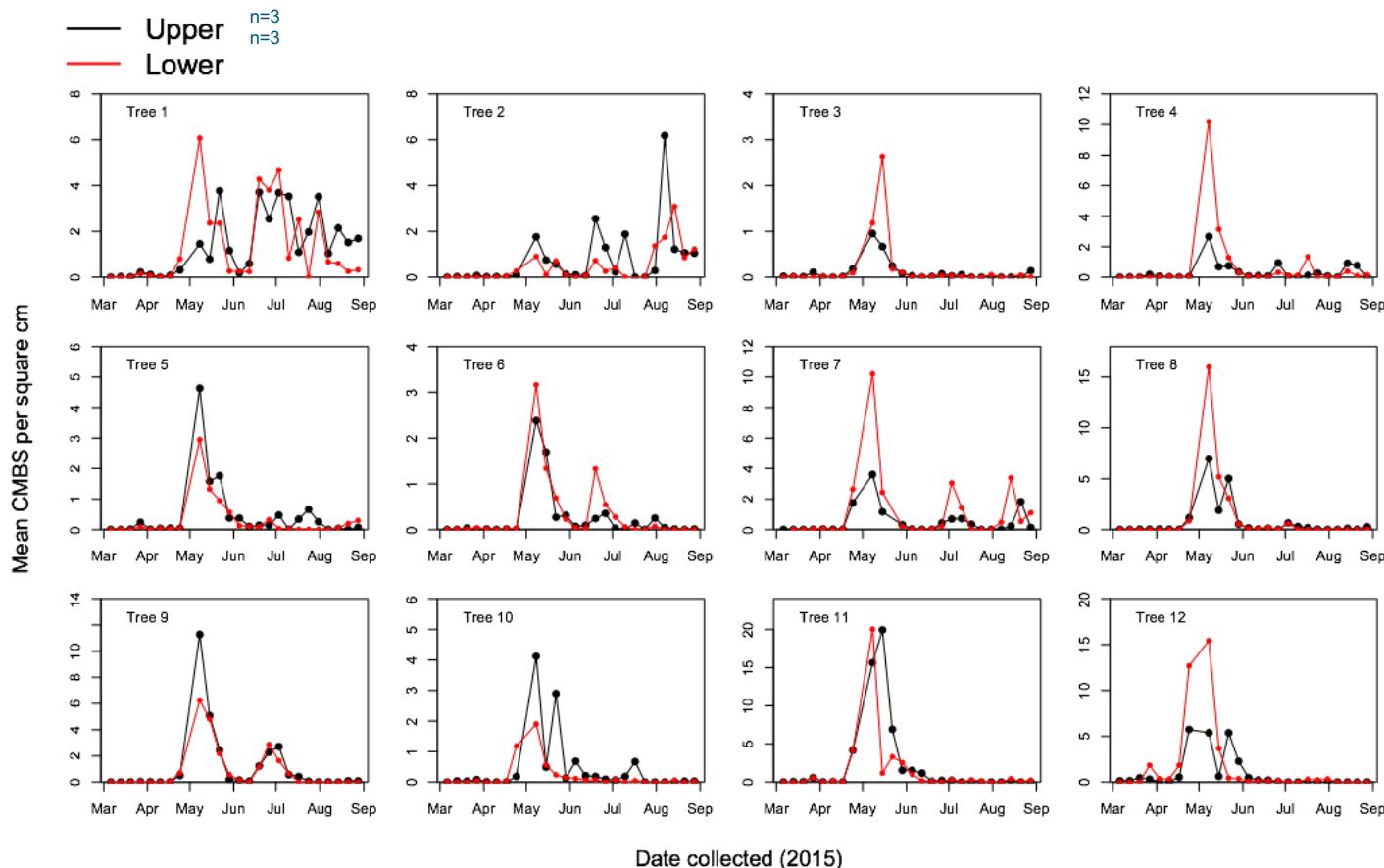




Objectives 2. Population Dynamics



Objectives 2. Population Phenology | 2015



Objectives 3. Management | Landscape

2016

n = 7 per treatment, n = 6 for control/water



Objectives 3. Management | Potted 2017



Crapemyrtle bark scale | Summary

Product	a.i.	Application Method	Frequency	Efficacy
Safari	Dinotefuran	Drench	1	Great
Talstar + Safari	Bithentrin + Dinotefuran	Bark Spray + Drench	2 & 1	Great
Safari	Dinotefuran	Bark Spray	1	Good
Fulcrum	Pyriproxyfen	Bark Spray	2	Good
Talus	Buprofezin	Bark Spray	2	Good
Altus	Flupyradifurone	Bark Spray	2	Moderate
Mainspring	Cyantraniliprole	Drench	1	Moderate
Mallet	Imidacloprid	Drench	1	Moderate - Good
Grandevote & Venerate	Chromobacterium subtsugae strain PRAA4- 1 & Burkholderia spp. strain A396	Bark Spray	2 & 2	Poor
Acelepyrn	Chlorantraniliprole	Bark Spray	2	Poor
AzaGuard	Azadirachtin	Bark Spray	2	Poor
Acephate	Acephate	Bark Spray	2	Poor
SuffOil-X + Molt-X	Mineral oil + Azadirachtin	Bark Spray	2	Poor
Ventigra	Afidopyropen	Bark Spray	2	Inconclusive
Pradia	Cyclaniliprole + Flonicamid	Bark Spray	2	Inconclusive
Sarisa	Cyclaniliprole	Bark Spray	2	Inconclusive

Objectives 3. Management | Landscape

Spray Application

2016



Objectives 3. Management | Landscape

Drenches



Objectives 3. Management | Potted



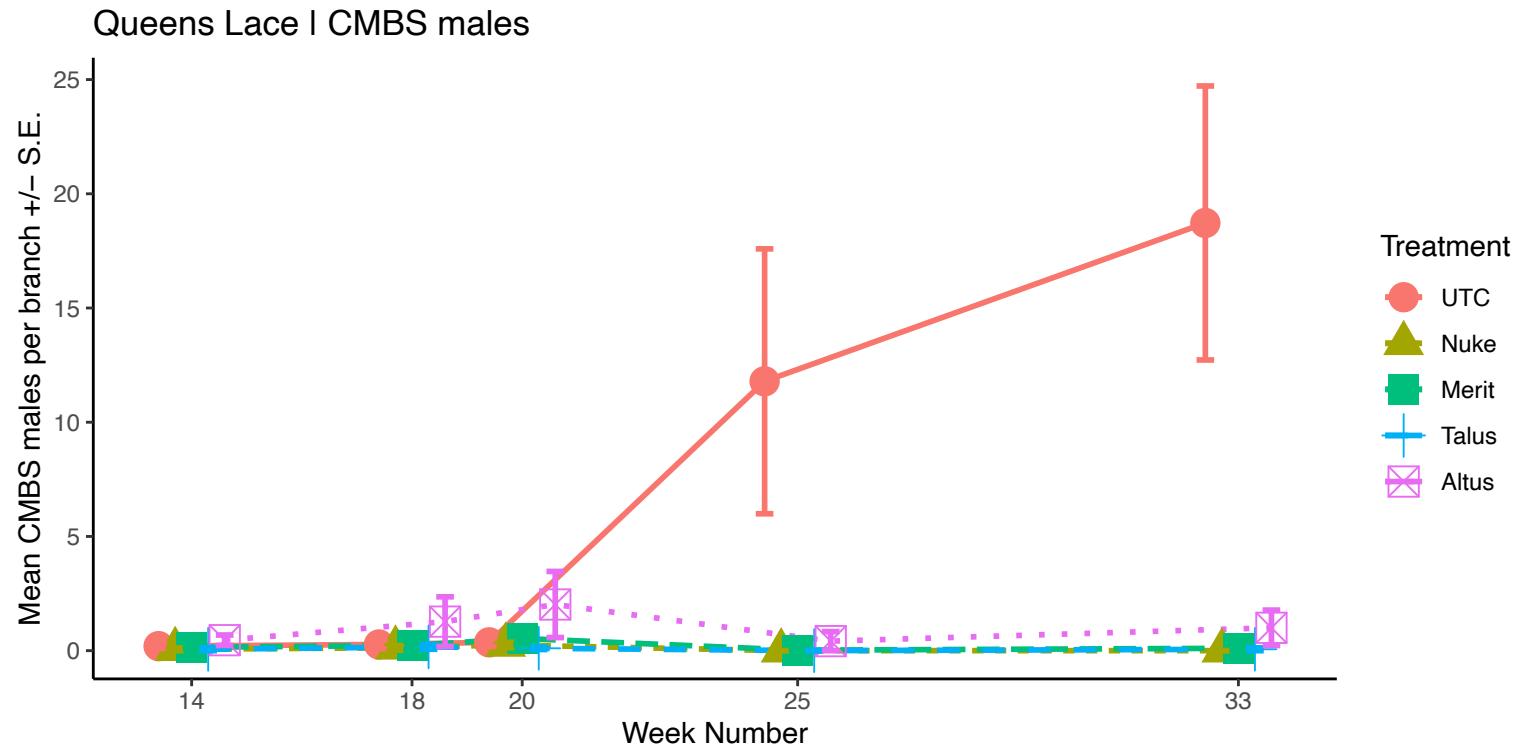
Obj



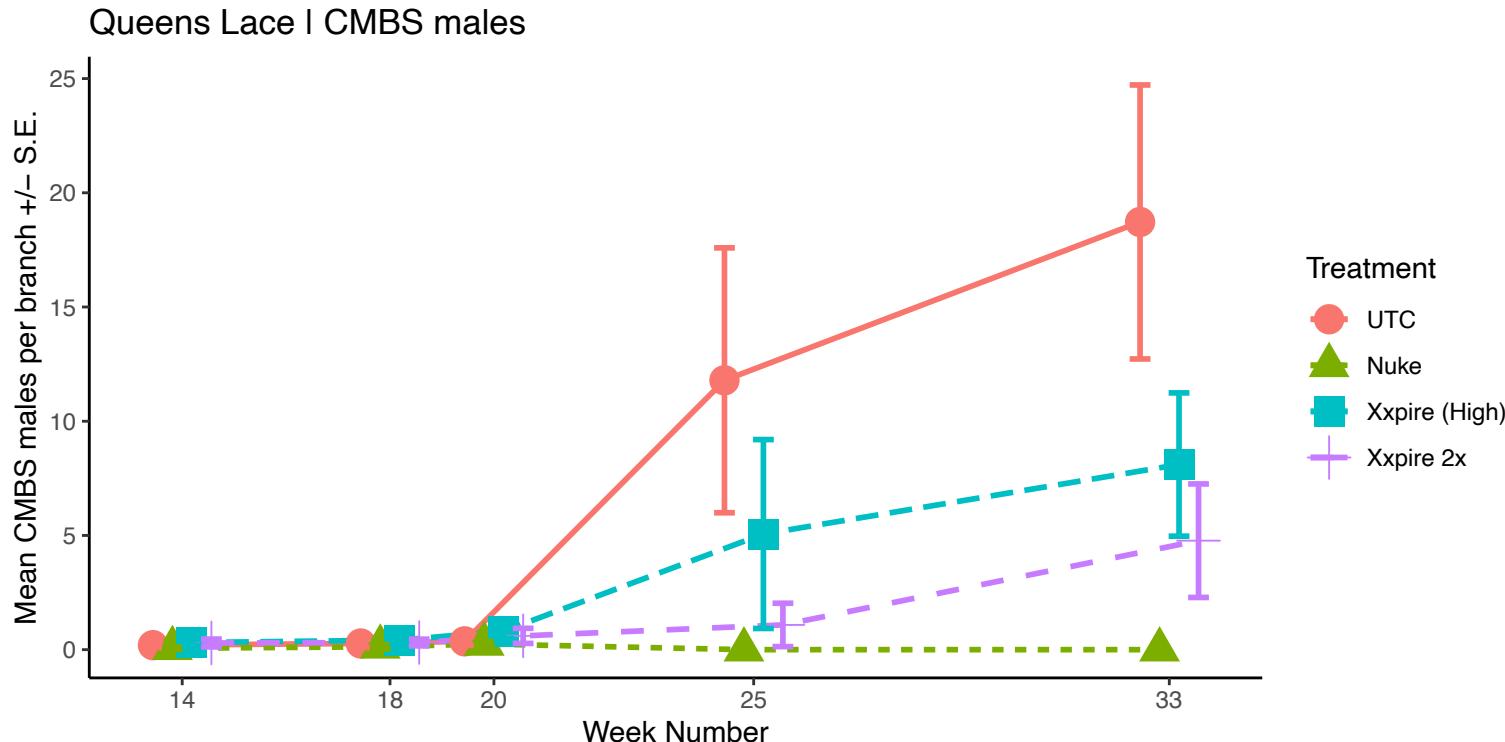
Crapemyrtle bark scale | Queens Lace

#	Tradename(s)	Treatname	active ingredients	rates	Method		Date(s)	
1	Water	UTC	-					
2	Safari	Nukem	Dinotefuran	4 fl. oz. of dilute solution (24 ounces/100 gal) in 20 fl. oz. of water	Drench	27-Mar		
2	Talus		Buprofezin	14 oz. 100 gal.	Bark Spray	15-Apr	29-Apr	
4	Xpire	Xpire_high	Sulfoxaflor & Spinetoram	3.5 oz / 100 gal	Bark/Foliar Spray	15-Apr	29-Apr	
5	Xpire	Xpire_2x	Sulfoxaflor & Spinetoram	14 oz (first app), then 7 oz. / 100 gal., 20 fl. oz. per pot	Bark/Foliar Spray	6-Apr	23-Apr	
6	Altus	altus	Flupyradifurone	3.7 fl oz / 100 gal,	Drench	16-Apr		
7	Merit	merit	Imidacloprid	1.5 fl oz / 100 gal, 0.5 L per pot	Drench	6-Apr		
8	Ventigra + CapSil	VC	Afidopyropen	7 oz / 100 gal + 6 oz / 100 gal.	Spray	15-Apr	29-Apr	
9	Velifer	VEL	B. bassiana PPRI 5339	13 oz. / 100 gal.		15-Apr	23-Apr	29-Apr 6-May
10	UltraPure Oil	ultVC	Horticultural Oil	2 gal / 100 gal		15-Apr	29-Apr	
10	Ventigra + CapSil		Afidopyropen	7 oz / 100 gal + 6 oz / 100 gal.		23-Apr		6-May
11	UltraPure Oil	ultVCVEL	Horticultural Oil	2 gal / 100 gal	15-Apr			
11	Ventigra + CapSil		Afidopyropen	7 oz / 100 gal + 6 oz / 100 gal.		23-Apr		
11	Velifer		B. bassiana PPRI 5339	13 oz / 100 gal			29-Apr	6-May
12	Talus	Talus-early	Buprofezin	14 oz. / 100 gal.	7-Apr	23-Apr		

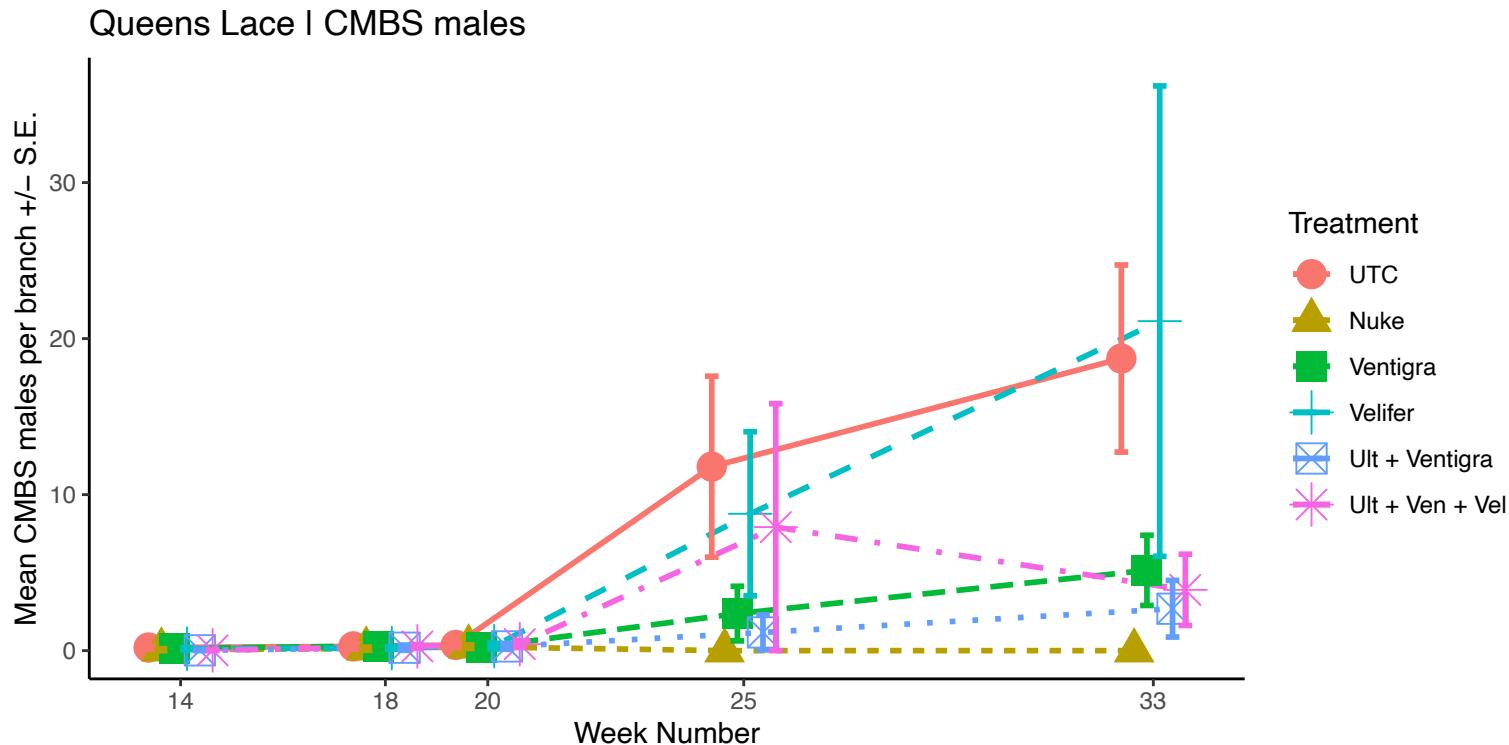
Crapemyrtle bark scale | Queens Lace



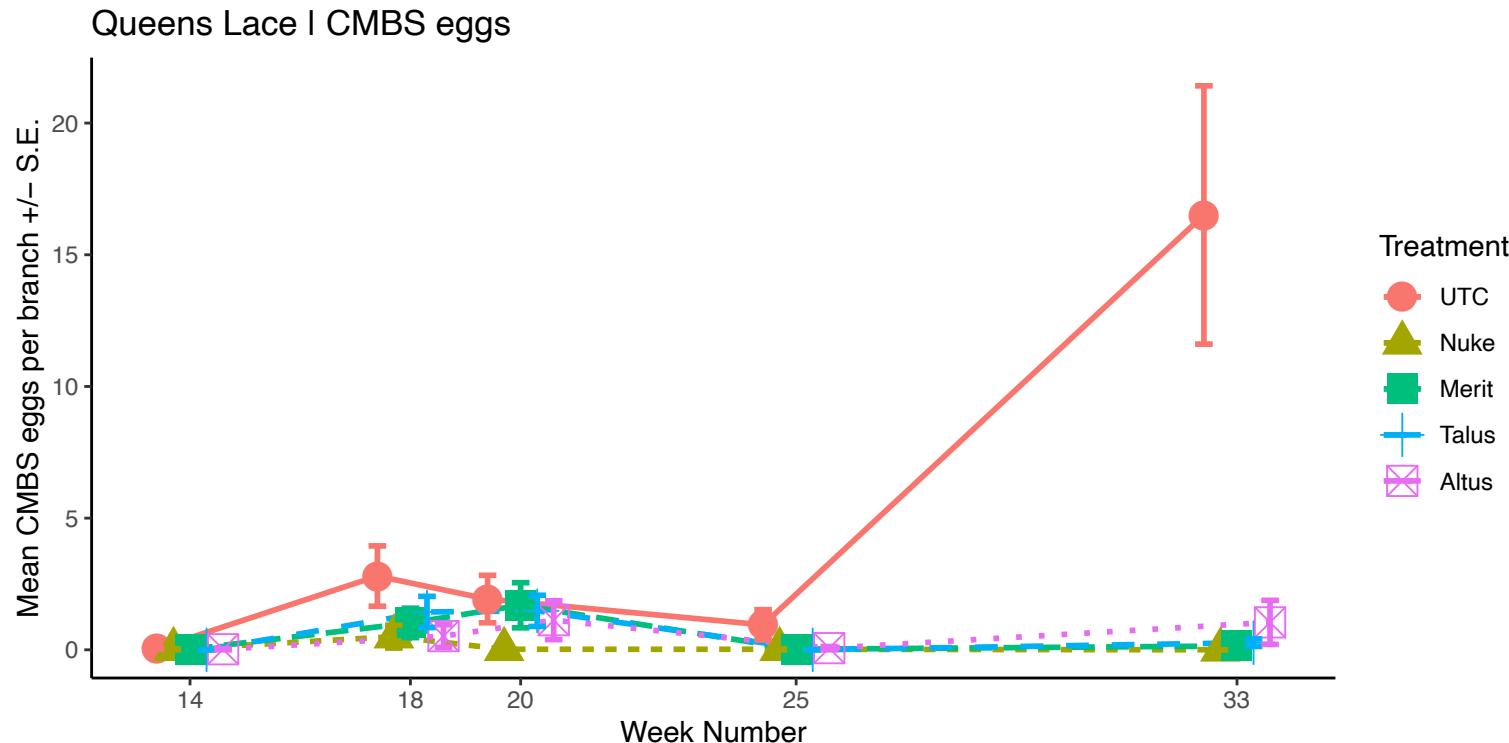
Crapemyrtle bark scale | Queens Lace



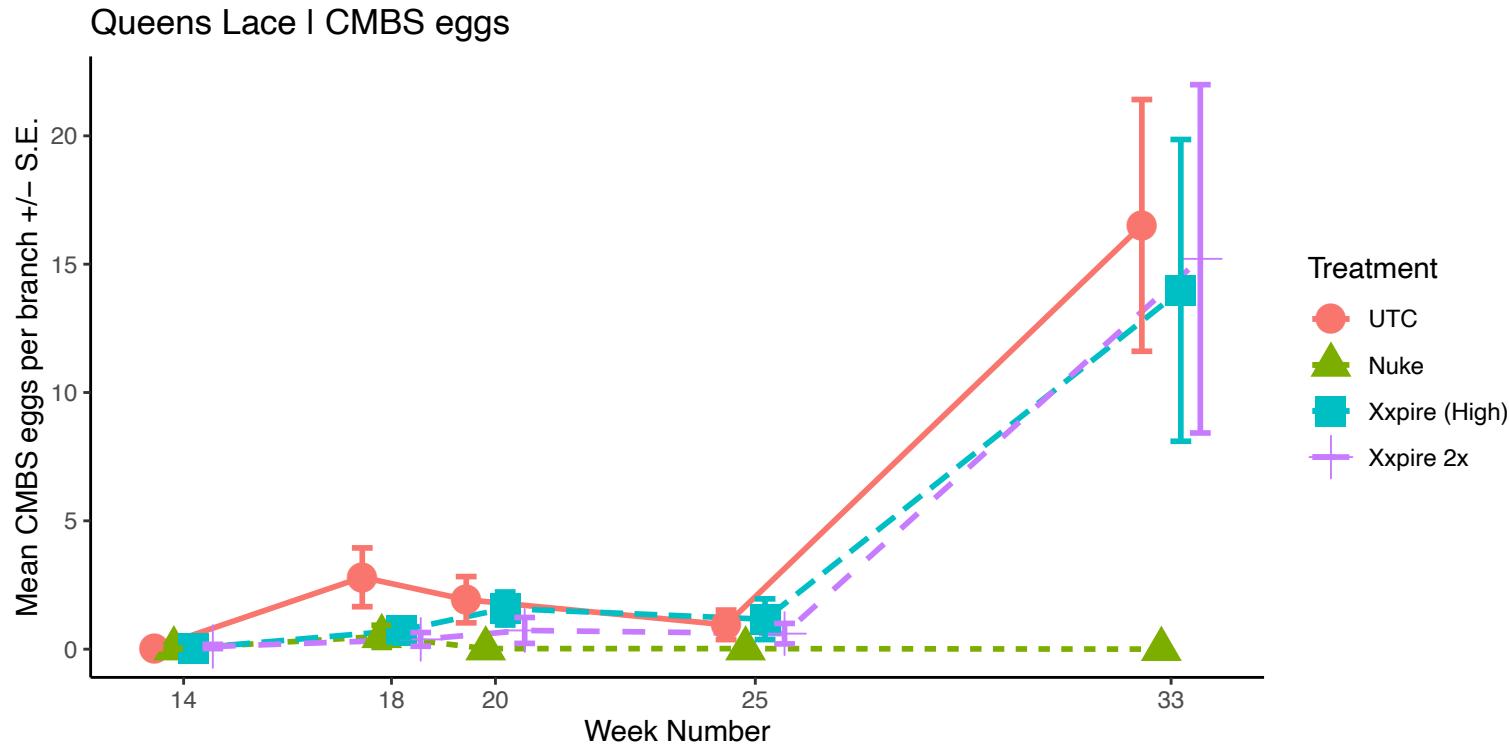
Crapemyrtle bark scale | Queens Lace



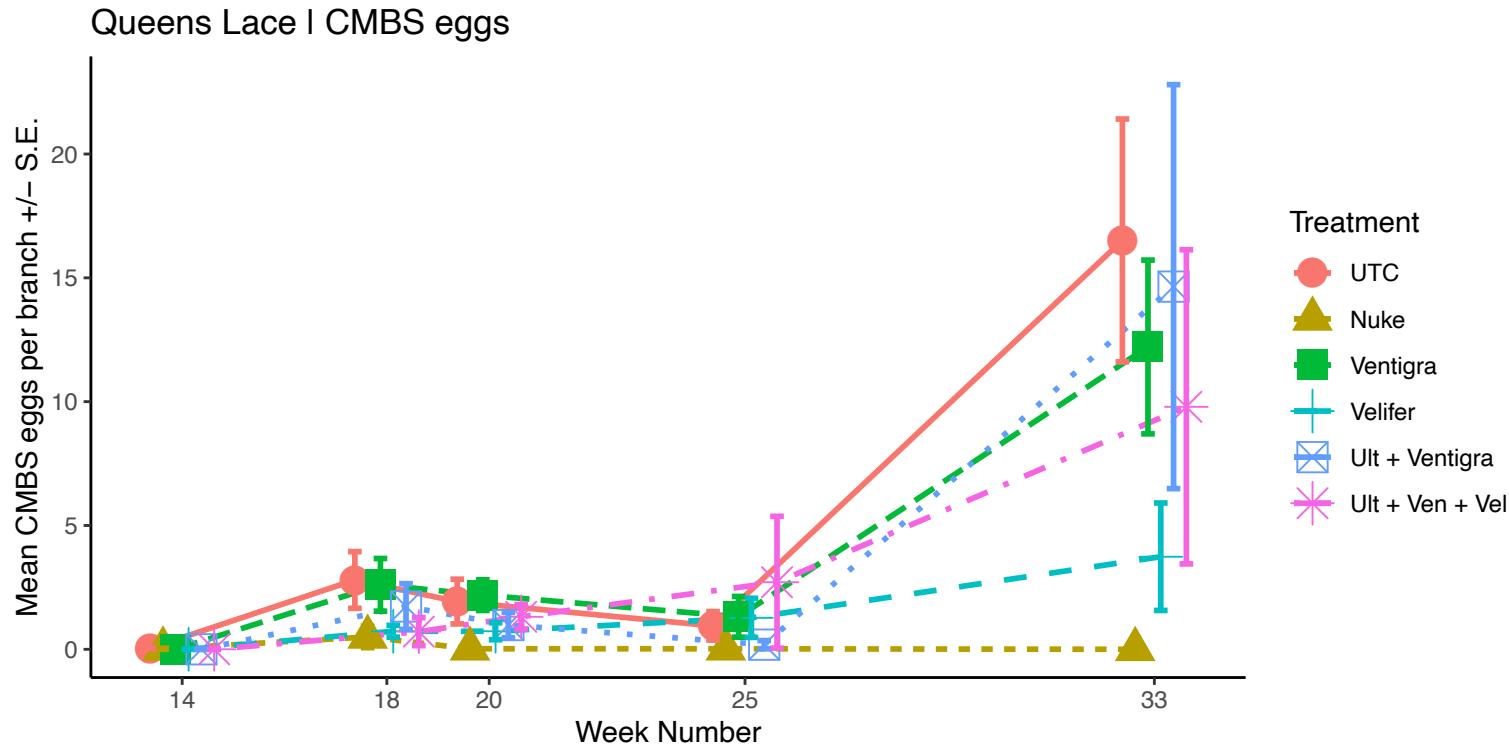
Crapemyrtle bark scale | Queens Lace



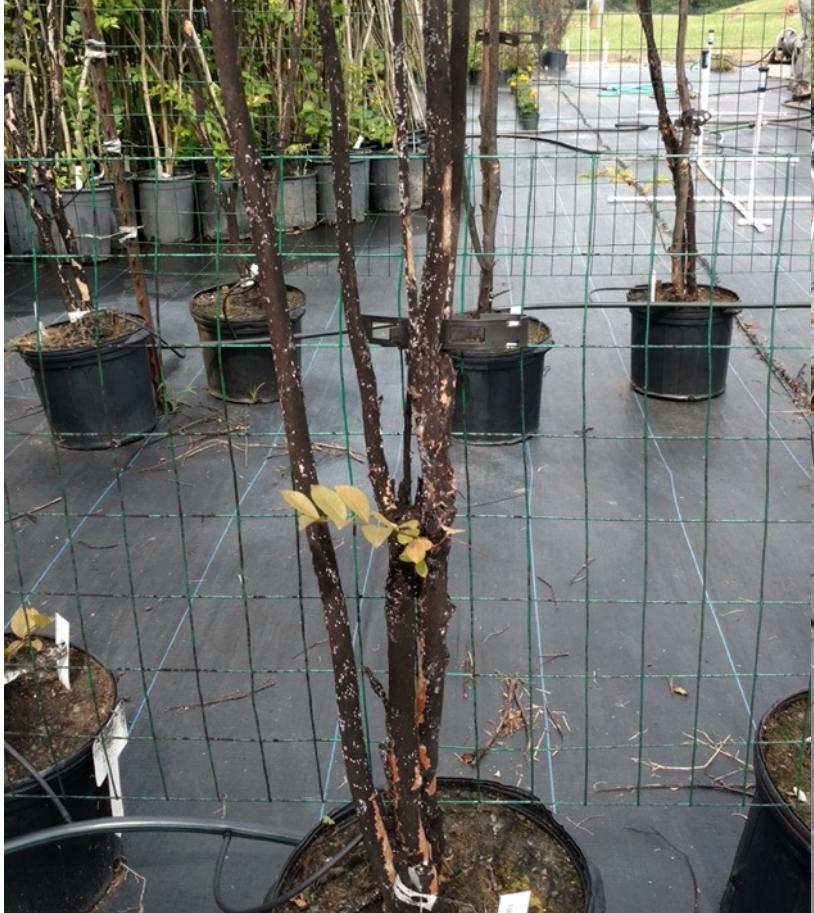
Crapemyrtle bark scale | Queens Lace



Crapemyrtle bark scale | Queens Lace



Objectives 3. Management | Potted







POLL EV – WHAT KIND OF SCALE IS THIS?



Objectives 4. Natural Enemies



CNBS NATURAL ENEMIES

2cm = ~1mm

Coccine loids



H. bimaculata



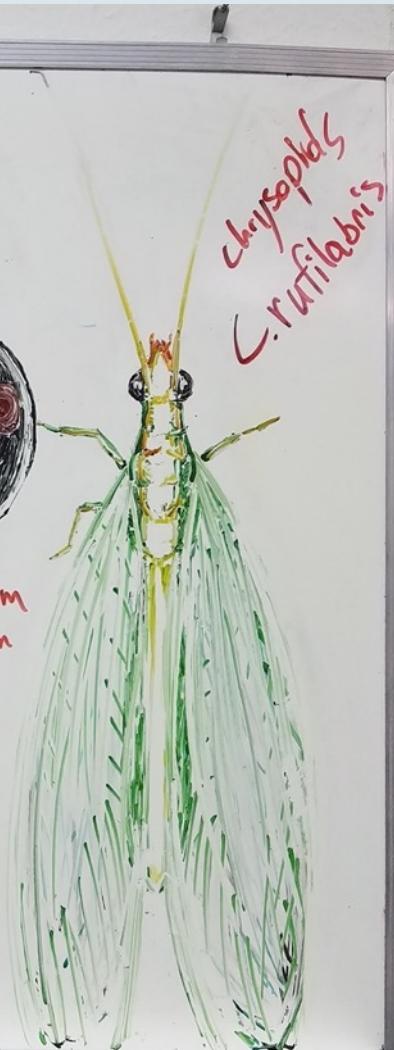
H. lateralis



L. Cacti



A. plurivora
var. *teranum*



Kyle Gilder, Texas A&M

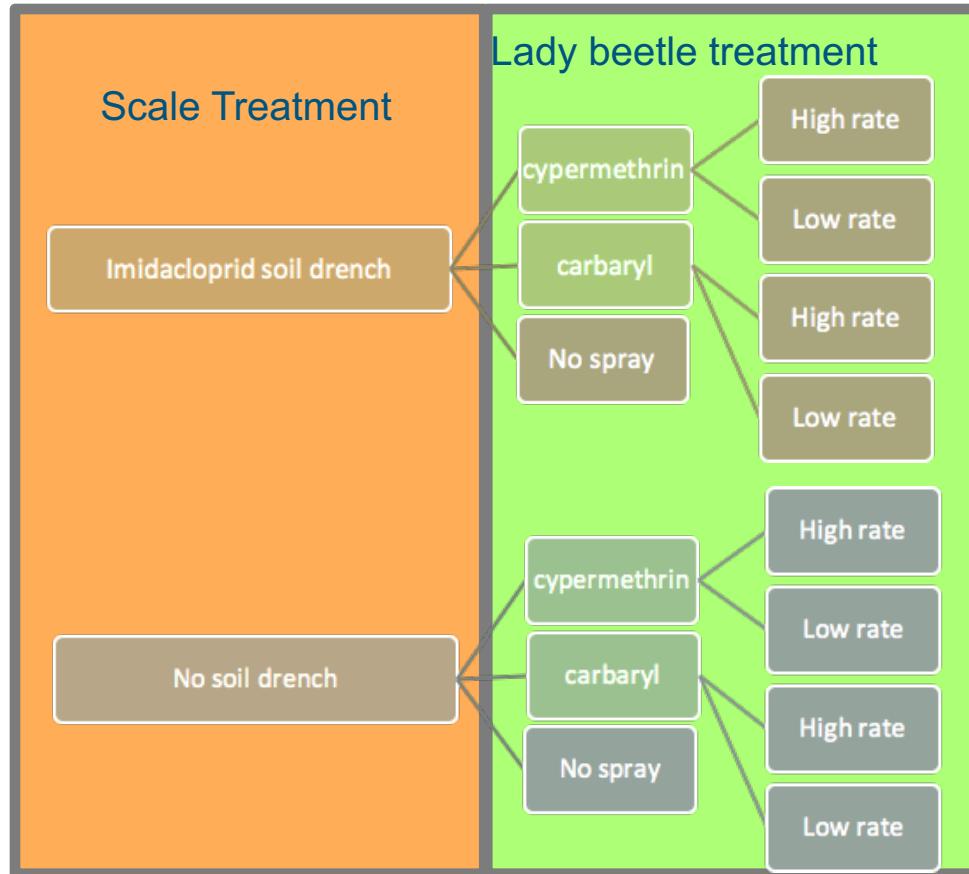
Objectives 4. Natural Enemies



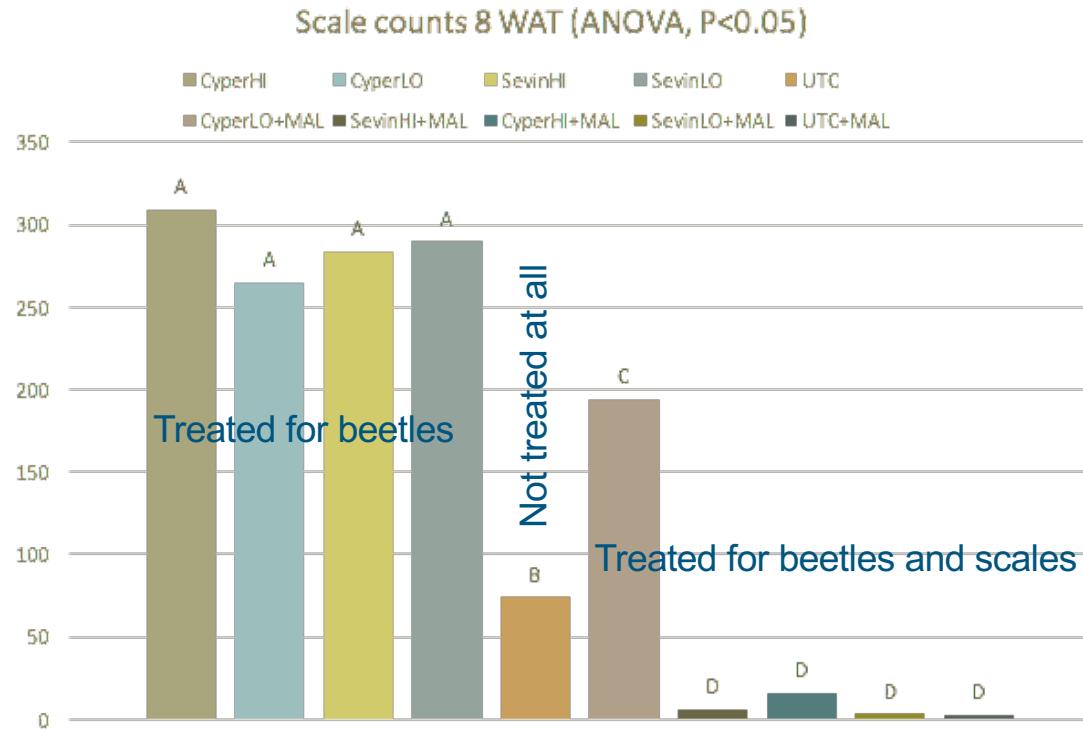
Kyle Gilder,
Masters Student
Texas A&M

Genus and species	Family	Order
Scale natural enemies		
<i>Hyperaspis bigeminata</i>	Coccinellidae	Coleoptera
<i>Hyperaspis lateralis</i>	Coccinellidae	Coleoptera
<i>Microweisea sp.</i>	Coccinellidae	Coleoptera
<i>Harmonia axyridis</i>	Coccinellidae	Coleoptera
<i>Chilocorus cacti</i>	Coccinellidae	Coleoptera
<i>Axion plagiatum var. texanum</i>	Coccinellidae	Coleoptera
<i>Cybocephalus sp.</i>	Cybocephalidae	Coleoptera
<i>Chrysoperla rufilabris</i>	Chrysopidae	Neuroptera
<i>Sympherobius barberi</i>	Hemerobiidae	Neuroptera
<i>Leucopis sp.</i>	Chamaemyiidae	Diptera
<i>Hyperaspis lateralis</i> pupal parasitoid		
<i>Homalotylus sp.</i>	Encyrtidae	Hymenoptera
<i>Leucopis sp.</i> parasitoid		
<i>Pachyneuron sp.</i>	Pteromalidae	Hymenoptera

Objectives 4. Natural Enemies



Objectives 4. Natural Enemies



* Percent control calculated with Henderson's method

Merchant 2016

Crapemyrtle bark scale | Summary

Phenology	<p>Crawler populations appear most active around beginning of May.</p> <p>Future: Collect data across wider climatic range in order to develop CDD model.</p>
Natural Predators	<p>Mostly lady beetles (<i>Symnus</i>, <i>Hyperaspis</i>, and <i>H. axyridis</i>)</p> <p>Can provide about 75% suppression in the landscape</p>
Management	<p>Bifenthrin, Imidacloprid, Dinotefuran, Buprofezin and Pyriproxyfen show most promise.</p>



United States Department of Agriculture
National Institute of Food and Agriculture



Cycad aulacaspis scale aka. Asian cycad scale

Aulacaspis yasumatsui

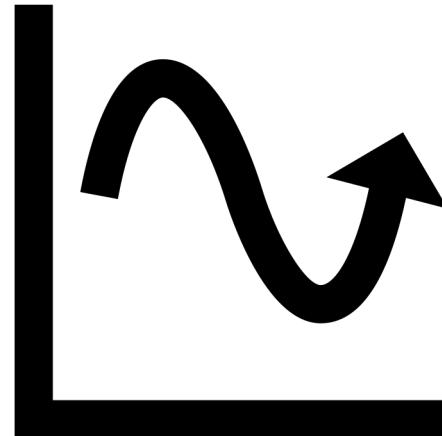
- 1996: found on cycads in Florida
- First described on cycads in Thailand in 1972 (Takagi 1977)
- Infest any part above ground and roots down to depth of 60 cm (~24 inches)



F.W. Howard, University of Florida, Bugwood.org

Cycad aulacaspis scale | Life cycle

- ▶ 7 – 15 days: egg development
- ▶ 4 – 18 days: 1st instar development
- ▶ 9 – 19 days: 2nd instar development
- ▶ 8 – 14 days: pre-ovipositional period (i.e. before females lay eggs)
- ▶ Lowest developmental temperature threshold: 8 – 12 C (46 – 54 F) (Cave et al. 2009)



Cycad aulacaspis scale

Plant hosts & damage



Florida Division of Plant Industry, Florida Department of Agriculture and Consumer Services, Bugwood.org

Cycad aulacaspis scale

Plant hosts & damage



Jeffrey W. Lotz, Florida Department of Agriculture and
Consumer Services, Bugwood.org

Cycad aulacaspis scale

Plant hosts &
damage



Jeffrey W. Lotz, Florida Department of Agriculture and
Consumer Services, Bugwood.org

Cycad aulacaspis scale

Prevention



- Inspect new plant materials
- Near base of the fronds
- Prevent movement of infested materials
 - Bag and trash (do not compost)

Cycad aulacaspis scale | Biological Control

Coccobius fulvus



Jeffrey W. Lotz, Florida Department of Agriculture and Consumer Services, Bugwood.org

Cybocephalus nipponicus



Pennsylvania Department of Conservation and Natural Resources - Forestry , Bugwood.org

Cycad aulacaspis scale

Insecticidal control

Contact Insecticides: multiple applications with good coverage

- Insecticidal oils (i.e. petroleum-based horticultural oil)
- Insecticidal soaps

Systemics:

- Dinotefuran (drench)
- Frequent hosing with water to remove old/dead scale

Cycad aulacaspis scale

Insecticidal control

Table 1.

% mortality in foliar treatments (7 DAT)

Treatment/ formulation	Gal product/ 100 gal	Adult females		2nd instars	
		Upper surface	Under surface	Upper surface	Under surface
Organocide	1.56	46b	8b	79ab	21cd
Ortho Hort. Oil	2	84a	19ab	100a	47b
Safer Insecticidal Soap	2	12c	1b	---	5d
Cygon 2E	0.52	71ab	35a	88a	85a
Check	---	1c	5b	54b	23c

Means within columns, followed by the same letter, are not significantly different ($P = 0.05$, DNMRT).

Common Landscape Scale Insects of Texas

- ▶ Crapemyrtle bark scale
- ▶ Cycad aulacaspis scale
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- ▶ Euonymous scale
- ▶ Obscure scale
- ▶ Oystershell scale
- ▶ Wax scales
- ▶ Cottony cushion scale
- ▶ Brown soft scale
- ▶ San jose scale

Tea scale

General Description

- Armored scale
- Indigenous to Asia; introduced ~1908
- ~1.5 mm in length; female egg sac dark, males light

Host Plants

- Chinese and yaupon holly, camellias, dogwood, ferns, figs, Satsuma orange, and tea plant

Significance

- Aesthetic damage
- Unacceptable in tea or ornamental production

Management

- Sticker spreader + good timing + good coverage (underside of leaves) + oils or soaps
- Dinotefuran* drench
- Pyriproxyfen, bifenthrin, or spinetoram + sulfoxaflor spray

Fiorinia theae



Clemson University - USDA Cooperative Extension Slide Series, Bugwood.org

*Neonicotinoid; pollinator impact hazard

False oleander scale

Pseudaulacaspis cockerelli

General Description

- Armored scale
- Pear-shaped and 2 – 3 mm long (female egg sacs)
- Resemble the cycad aulacaspis scale in appearance

Host Plants

- Over 100 plant species hosts; magnolia, sweetbay, bird-of-paradise, flowering dogwood, oleander, banana shrub, and palmetto.

Significance

- Aesthetic; problematic in ornamental production

Management

- Horticultural oil + Spreader/sticker + good coverage + good timing
- Thiamethoxam spray*



Jeffrey W. Lotz, Florida Department of Agriculture and Consumer Services, Bugwood.org

*Neonicotinoid; pollinator impact hazard

Euonymus scale

Unaspis euonymi

General Description

- Armored scale
- Females ~1.6 mm in length
- Female egg sacs brown (oyster-shaped); male pupae are white

Host Plants

- Euonymus, celastrus, camellia, eugenia, hollies, pachysandra and twinberry

Significance

- Whole branch or even whole plant can die of heavy infestation

Management

- *Chilocorus kuwanae* (lady beetle; black with red dots) released to suppress populations
- Dinotefuran* drench
- Bifenthrin + Clothianidin*, Pyriproxyfen, or neem oil



John .A. Davidson, Univ. Md, College Pk, Bugwood.org

*Neonicotinoid; pollinator impact hazard

Obscure scale

Melanapsis obscura

General Description

- Armored scale
- Female egg sacs about 3 mm long
- Blend in extremely well with the bark (hence the name "obscure")

Host Plants

- Dogwood, beech, hackberry, hickory, maple, and oak

Significance

- Can cause premature leaf drop and branch dieback
- Seldom kills, but can increase susceptibility to other pests

Management

- Lady beetles and parasitic wasps
- Horticultural oil (growing season) or dormant oil during the winter



James Solomon, USDA Forest Service, Bugwood.org

Oystershell scale

Lepidosaphes ulmi

General Description

- Armored scale
- Males and females about 2.5 mm long and resemble oystershell

Host Plants

- More than 100 plant species; e.g. lilac, ash, poplar, dogwood, maple, and willow.

Significance

- Heavy infestations can kill twigs and branches
- Very heavy infestations can result in cytospora canker

Management

- Research and resources scarce
- Similar to other armored scale



Whitney Cranshaw, Colorado State University, Bugwood.org

Wax scales

Ceroplastes sp.

General Description

- Soft scale, produce honeydew and result in sooty mold
- Up to 6.4 mm in diameter (barnacle scale)
- Coated with heavy layer of wet beige, pinkish, whitish, or grey wax

Host Plants

- Ficus, gardenia, hawthorne, holly, crapemyrtle, ornamental pear, pyracantha and other landscape trees and shrubs.

Significance

- Leaf discoloration and branch dieback. Tree mortality possible with high densities.
- Mainly problematic in ornamental production

Management

- Naturally occurring parasitic wasps
- Thiamethoxam*, Acetamiprid*, Dinotefuran*, buprofezin, bifenthrin



Joseph LaForest, University of Georgia, Bugwood.org

*Neonicotinoid; pollinator impact hazard

Cottony cushion scale

Icerya purchasi

General Description

- Introduced through California in 1860s
- Copious amounts of honeydew & sooty mold
- ~1,000 round eggs per egg sac

Host Plants

- Citrus, apple, Boston ivy, boxwood, cypress, hackberry, locust, maple, oaks, peaches and plums (*Prunus*), pecan, pears, pine, pittosporum, pomegranate, quince, rose, verbena, walnut, willow and other woody ornamentals.

Significance

- Decreased tree vitality, fruit drop, and defoliation
- Most problematic in fruit and ornamental production

Management

- Vedalia beetle; Classical biological control poster-child
- Acetamiprid*, Orthene TTO



Will Hudson, University of Georgia, Bugwood.org

*Neonicotinoid; pollinator impact hazard

Brown soft scale

Coccus hesperidum

General Description

- Soft scale, produces honeydew = sooty mold
- Adults slightly convex reddish-brown, with brown or black spots/patterns

Host Plants

- Recorded feeding on 346 plant genera from 121 plant families; e.g. citrus, ferns, ficus

Significance

- Problematic in young plantings; high reproductive potential

Management

- Naturally occurring parasitic wasps (*Metaphycus spp*); avoid use of broad-spectrum insecticides
- Similar to crapemyrtle bark scale



John .A. Davidson, Univ. Md, College Pk, Bugwood.org

San Jose Scale

Quadraspidiotus perniciosus

General Description

- Armored scale
- Females under grey circular wax covering; males under smaller white oval covering with raised dot near one end.

Host Plants

- Apple, pear, peach, plums, Osage orange, other fruit trees, shrubs and shade trees.

Significance

- Considered major pest of citrus and stone fruits in Texas

Management

- Mostly focused on management in fruit orchards



United States National Collection of Scale Insects Photographs , USDA Agricultural Research Service, Bugwood.org

Common Landscape Scale Insects of Texas

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Questions?

