

A New Pest of Sorghum: the Sugarcane Aphid

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TEXAS A&M
AGRILIFE
EXTENSION





Weslaco : Oct 24 2013





Weslaco : Mid-Dec 2013

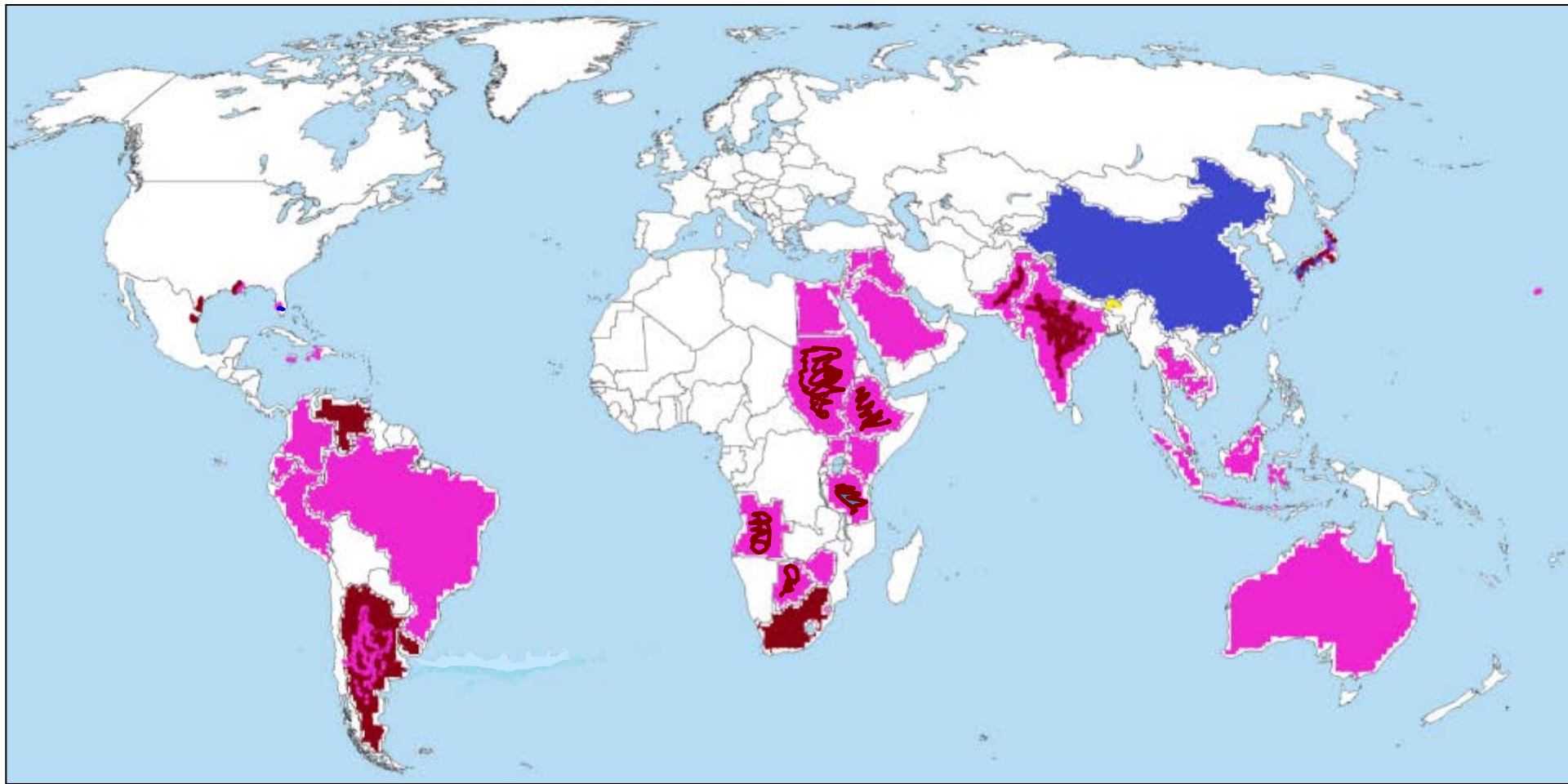


What are sugarcane aphids?

- Soft bodied insects that sucks sap from plant tissues and produce honeydew that may hamper transpiration.



World distribution of the sugarcane aphids



Sugarcane aphids found on different host plants in the world. Notice that this aphid only infested one plant host species in some countries while other hosts were not affected (**Adapted from *Singh et al. 2004***)

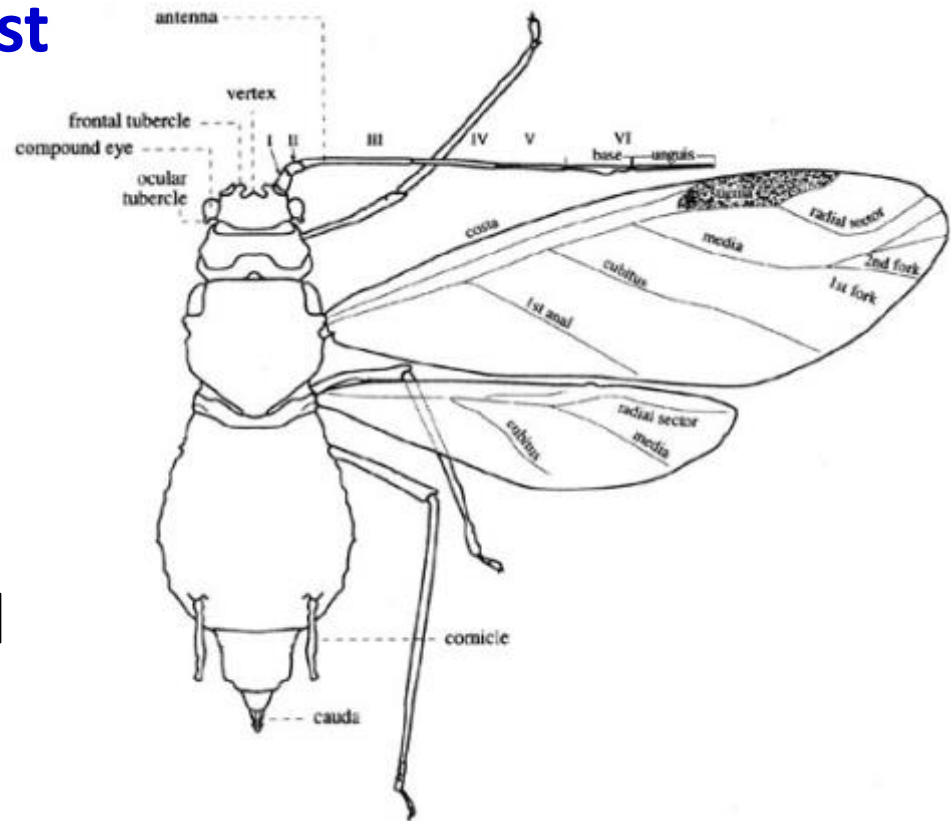
Problems with the ID of the sugarcane aphids

- Taxonomically this **new pest of sorghum** was indistinct to *Melanaphis sacchari*

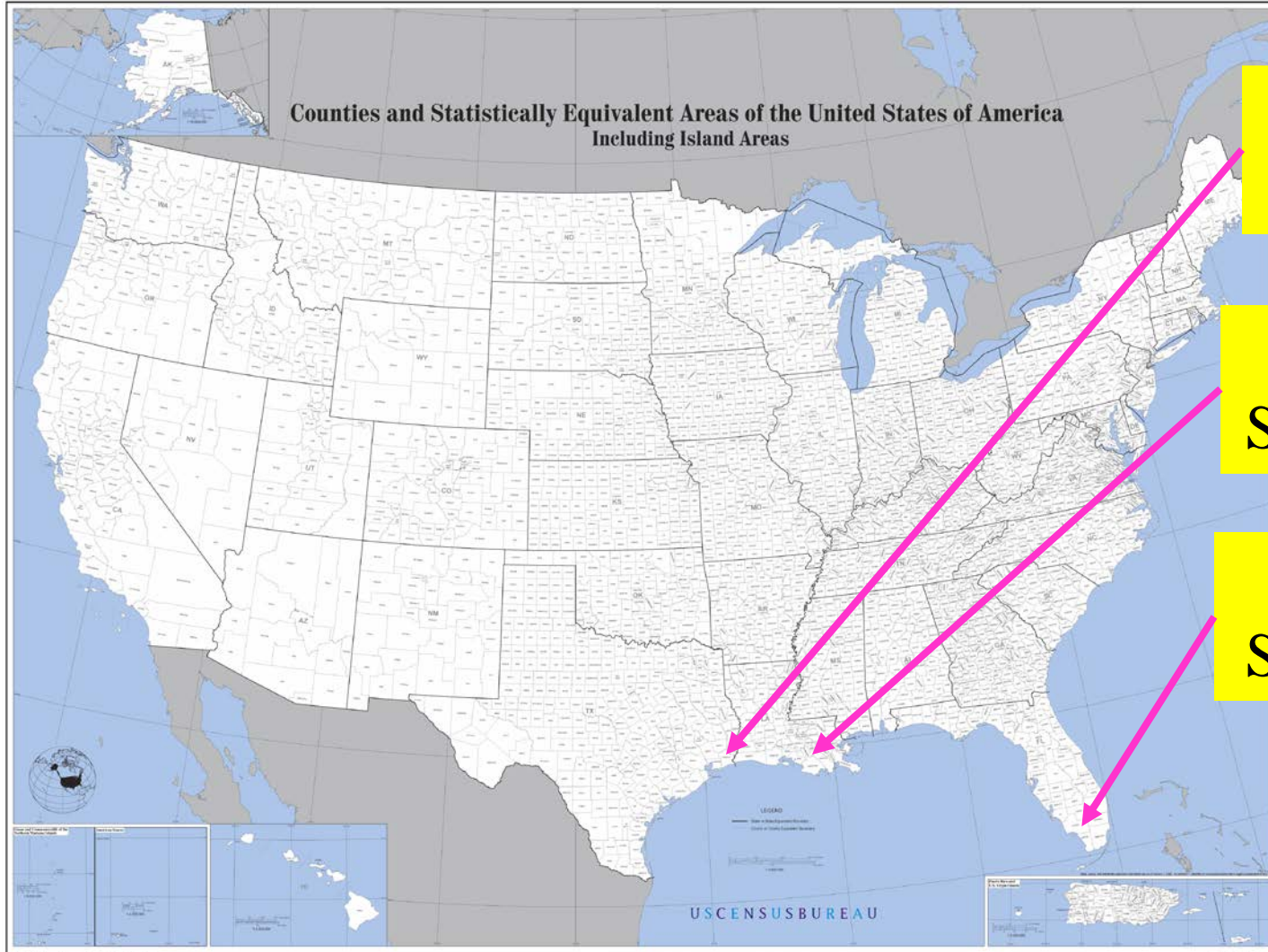
- Using molecular tools it matched the taxonomic ID

- However, there are several biotypes in the world

- A **host shift might occurred** (*It wouldn't be the first time for aphids*) or **a new biotype was introduced**



HISTORICAL REPORTS ON THE PRESENCE OF SUGARCANE APHIDS IN THE USA



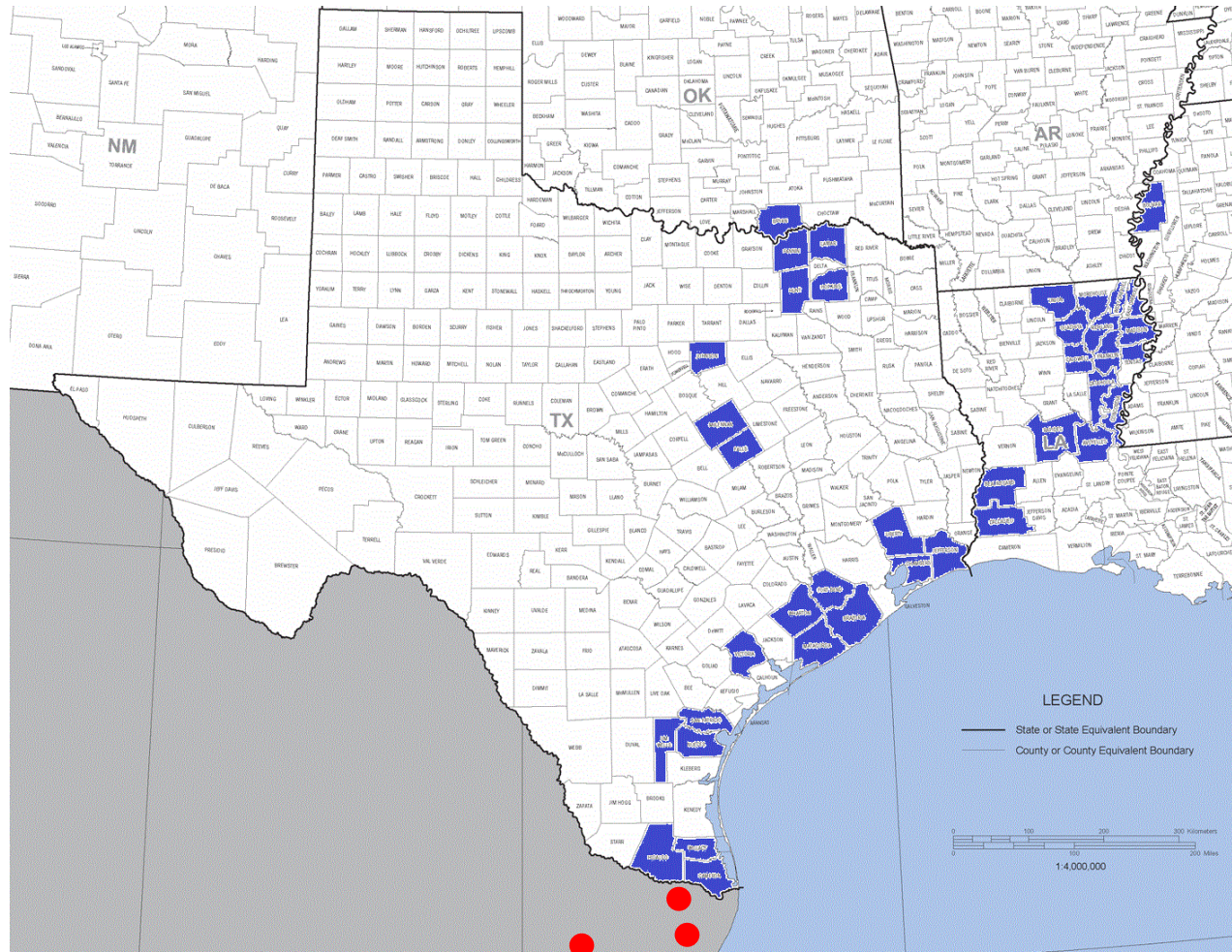
**2013 - TX
SORGHUM**

**1999 - LA
SUGARCANE**

**1977 - FL
SUGARCANE**

Expansion of the sugarcane aphid 2013

Mid-June 2013:
1st report of
infestations in
sorghum near
Beaumont in
TX, by Dr. Way



The new aphid pest of sorghum was detected in 38 counties and parishes of Texas, Louisiana, Oklahoma, and Mississippi in 2013. All sorghum growing counties in may be at risk. Further expansions into other areas is a possibility. This aphid spreads rapidly across a wide geographic range. The three red dots are the approximate locations where this aphid was reported in Rio Bravo, San Fernando and C. Victoria in Mexico.



Effects on Yield

- Yield losses can be as high as 78%
- In South Africa losses had been reported between 24 to 73% %
- In Louisiana and Mexico losses reported between 50 to 100%
- In Weslaco seed increase plots were completely lost



Grain Quality

- Aphid feeding did not affect grain color but reduce grain hardness in South Africa
- Softer grain may have a significant impact in the milling industry
- Diastatic power reduced: production of a number of enzymes such as amylase which convert starch into sugar



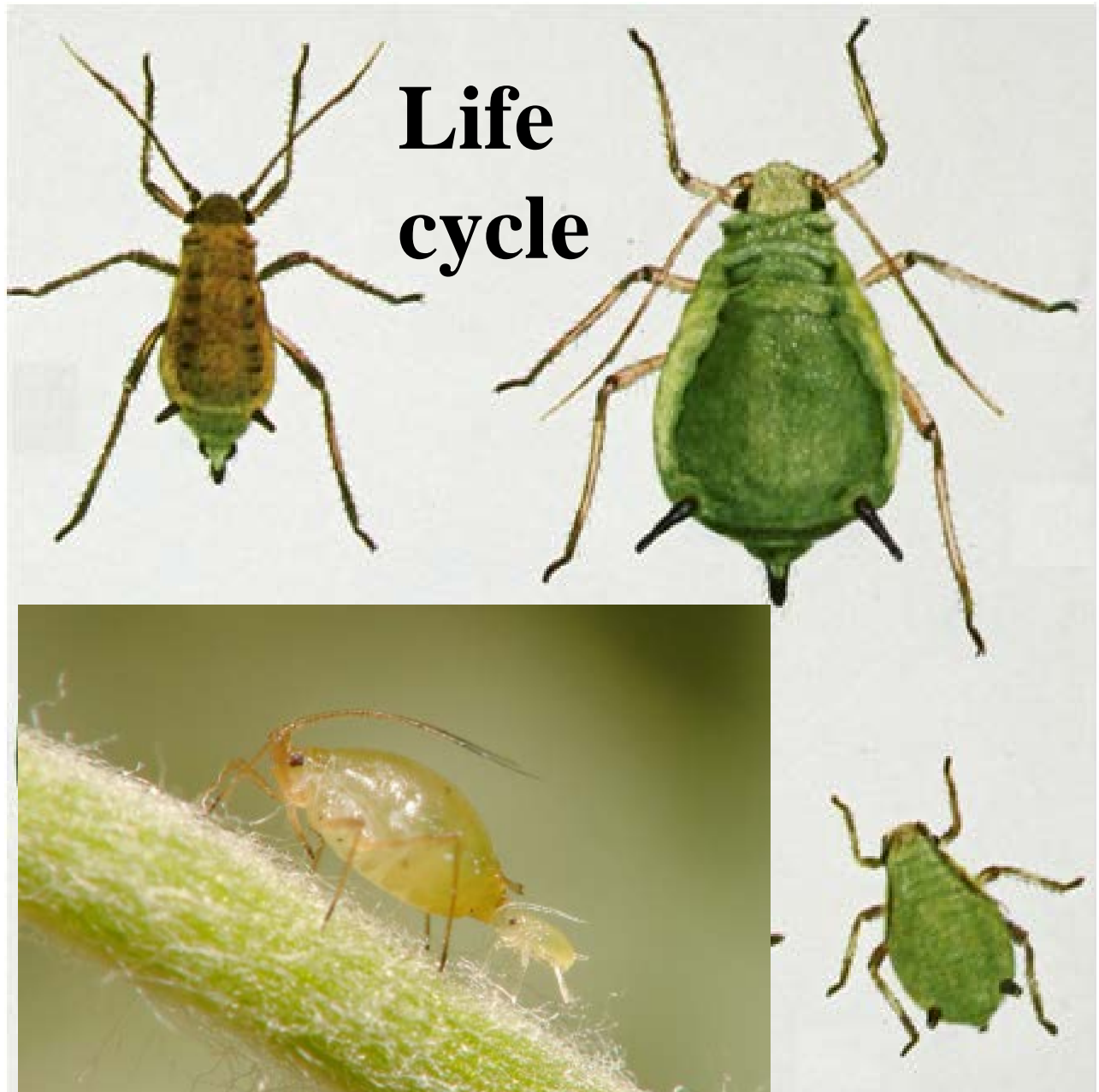
Sugarcane aphids: colonize lower surface of leaves





Sugarcane aphids

- All females and live 28 days (range 10-37 days)
- 4 nymphal instars can be adults in 5 days
- Nymphs can developed on 4.3 to 12.4 days
- Born alive (viviparous)



Exponential growth of populations

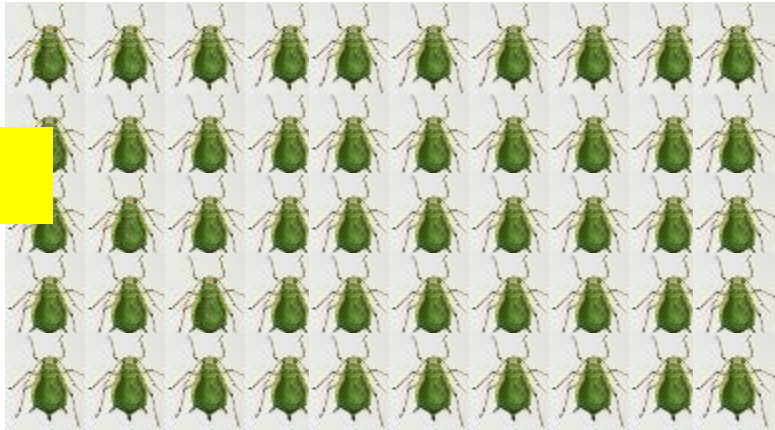
Foundress



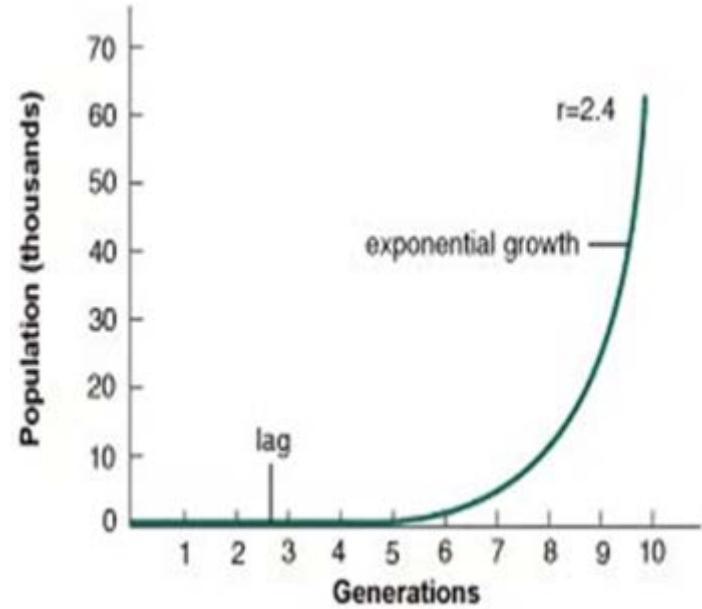
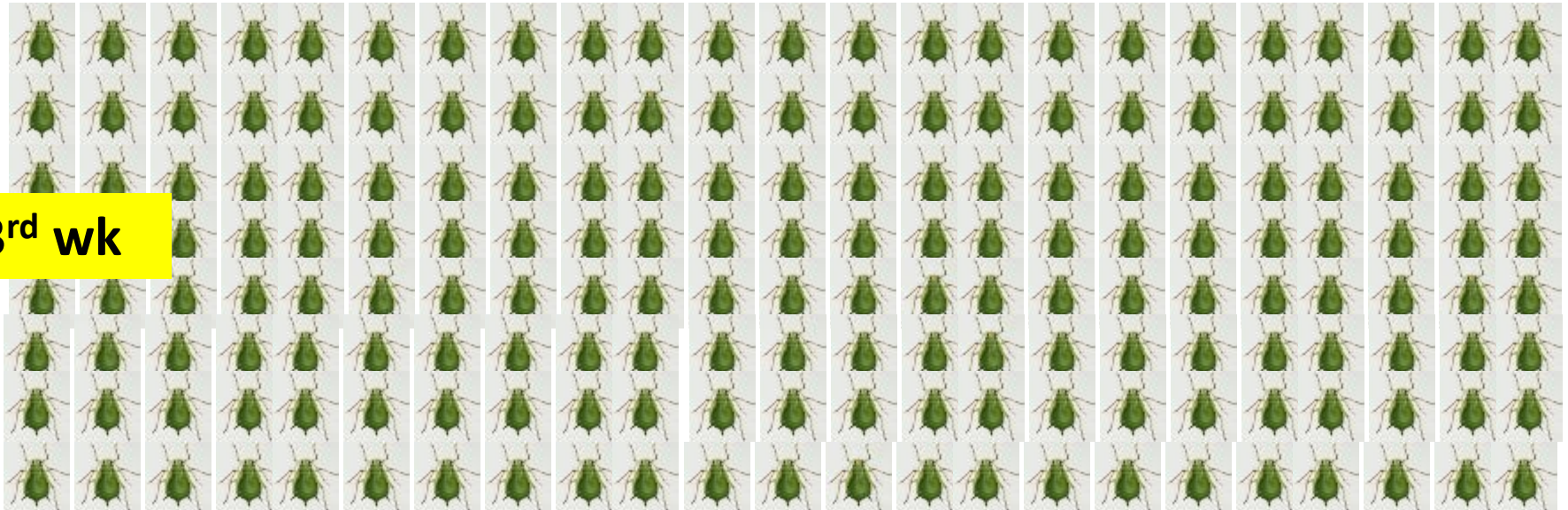
1st wk



2rd wk



3rd wk

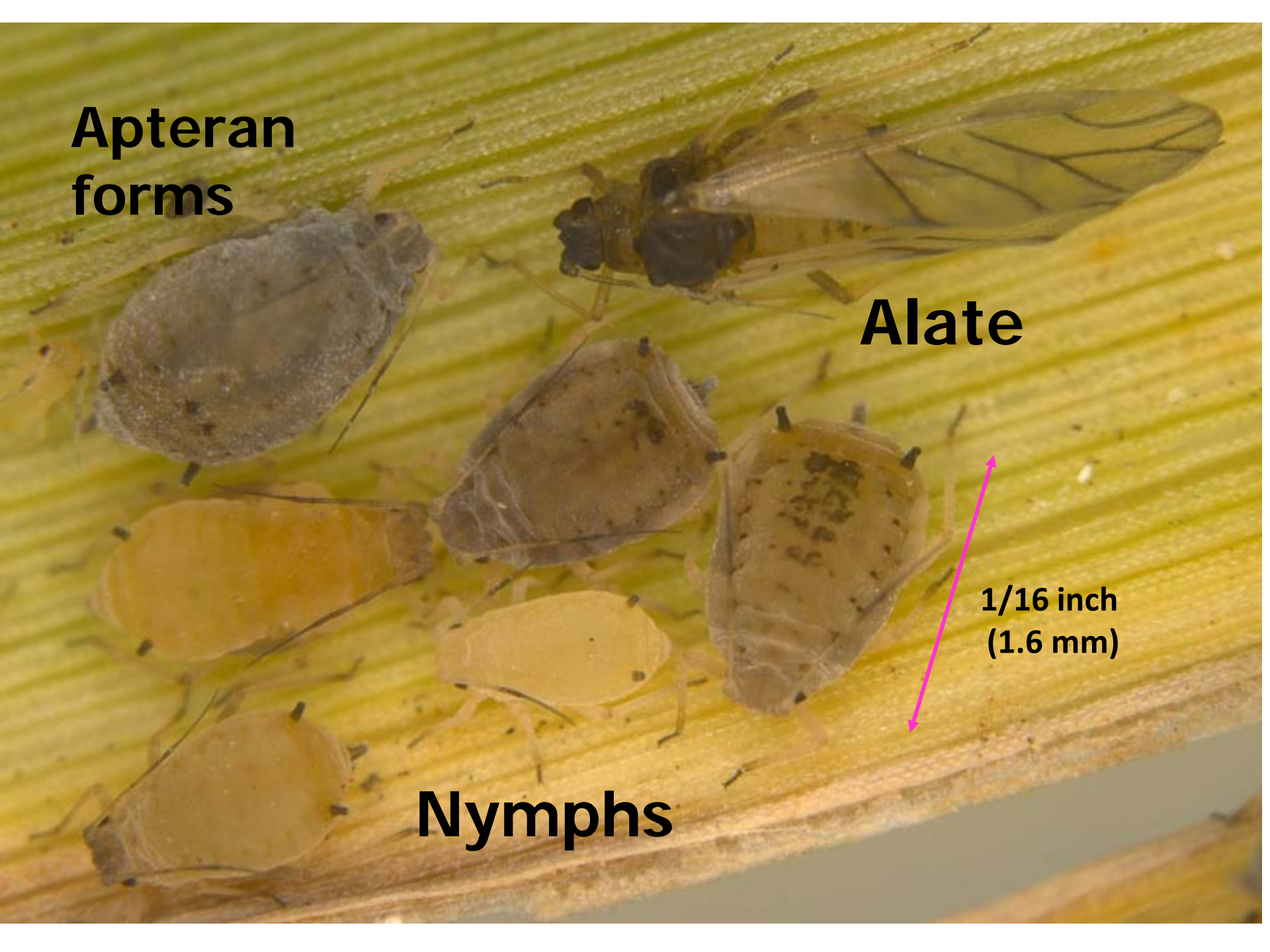


**Apteran
forms**

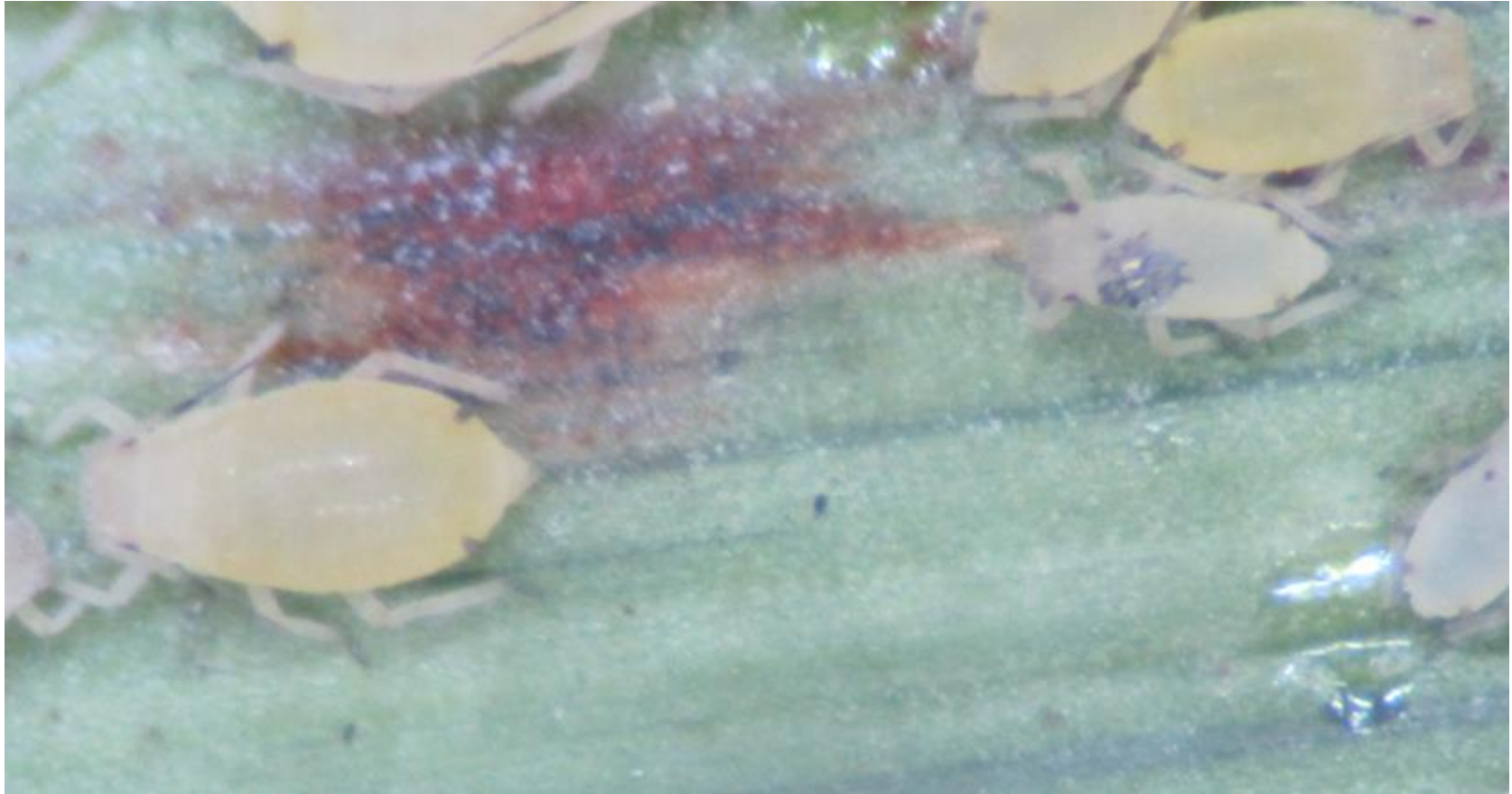
Alate

**1/16 inch
(1.6 mm)**

Nymphs



Damage on under side of leaves





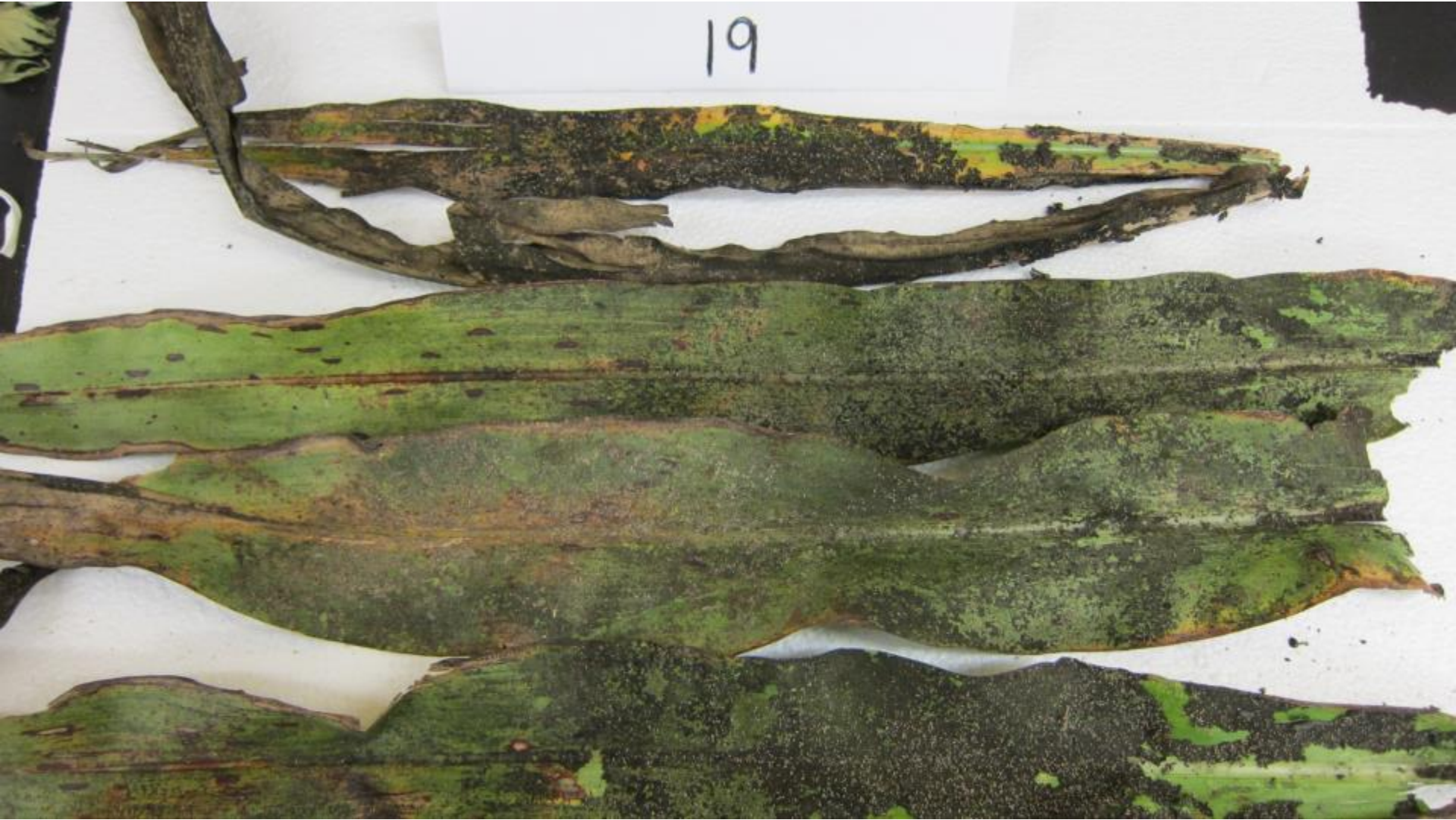


Symbiosis of aphids and ants





Louisiana: problems during harvest due to honeydew





Combine in Tamaulipas, MX with abundant sugarcane aphids





Other aphids species pests of sorghum



Corn leaf aphid

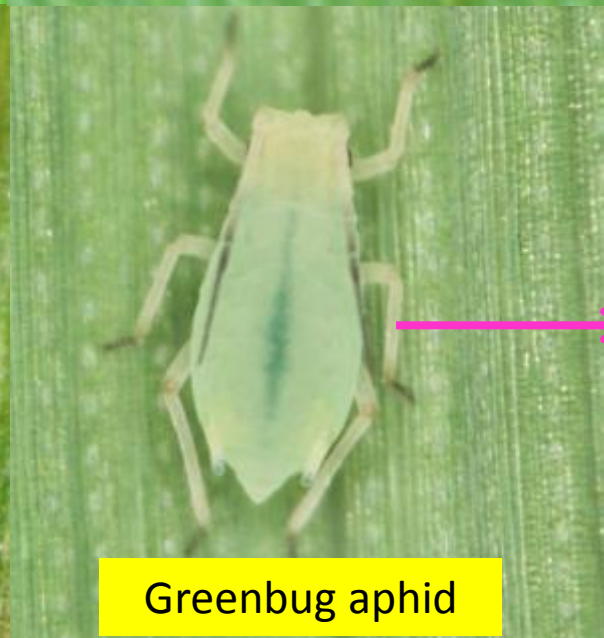


Yellow sugarcane aphid

Prefers young plants



Sugarcane aphid



Greenbug aphid

Biotypes are reported

Resistant cultivars

- Dr. Armstrong (USDA-Stillwater OK): cultivar TX-2783 does provide seedling resistance.
- Many sorghum lines are being evaluated for resistance by Drs. Peterson and Rooney, Texas AgriLife Research.
- **Commercial lines???**



Natural enemies

Insects:

- Parasitoids
- Lacewings
- Ladybeetles
- Sweat flies
- Thrips

Fungus

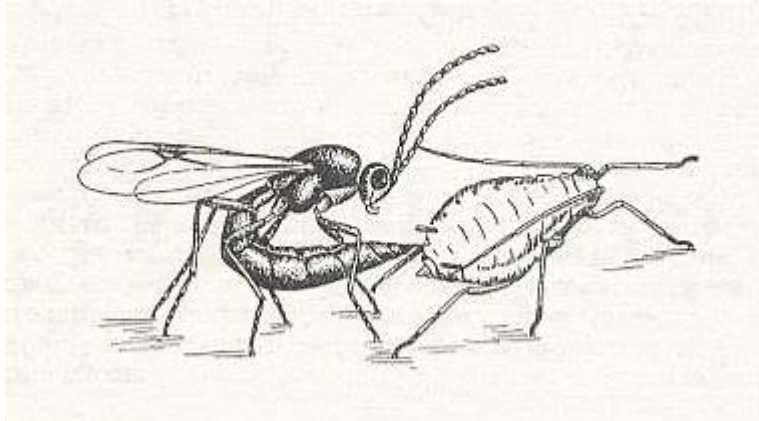
- *Lecanicillium lecanii*



Weslaco, January 2014 (R. Villanueva)



Parasitoids



Lace wings



Lady beetles

Harmonia axyridis



Exochomus childreni



Cryptolaemus



Scymnus



Cycloneda sanguinea



Sweat Flies or Syrphids



Fungus (?) *Lecanicillium lecanii*

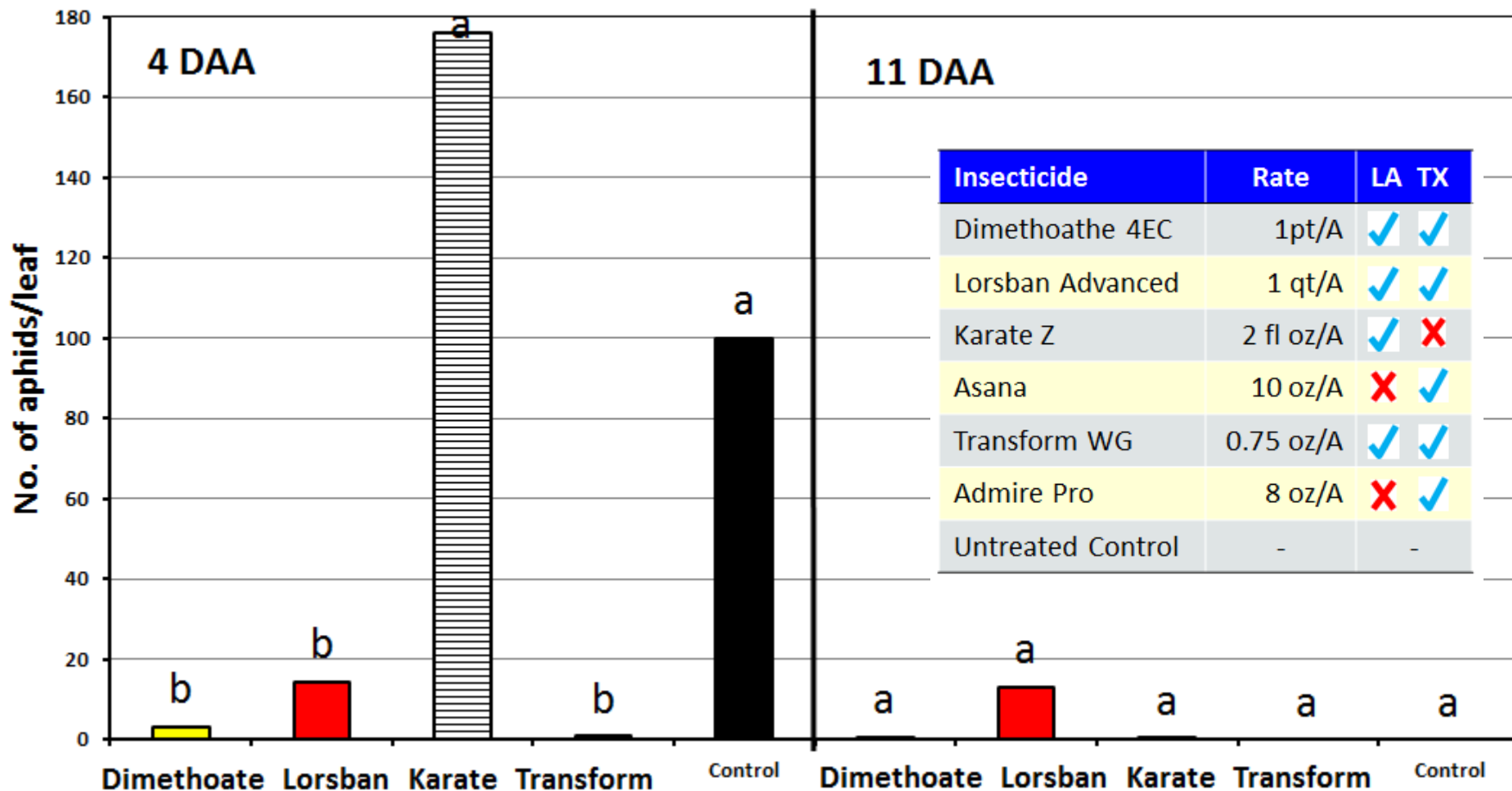


Chemical control

- Weslaco: Experimental seed increase plots were heavily affected
- Louisiana: Farmer fields were heavily affected, in spite of 2 or 3 applications of **Lorsban**
- Tamaulipas: Farmers and experimental fields were heavily infested, there were **up to 10 applications** of mixtures Chlorpyrifos (Lorsban) m cypermethrin, methomyil
- Success with metamidophos (Monitor, Nitofol, Tamaron, Swipe, Nuratron, Vetaron, Filitox, Patrole, Tamanox). Currently phased out in the U.S.

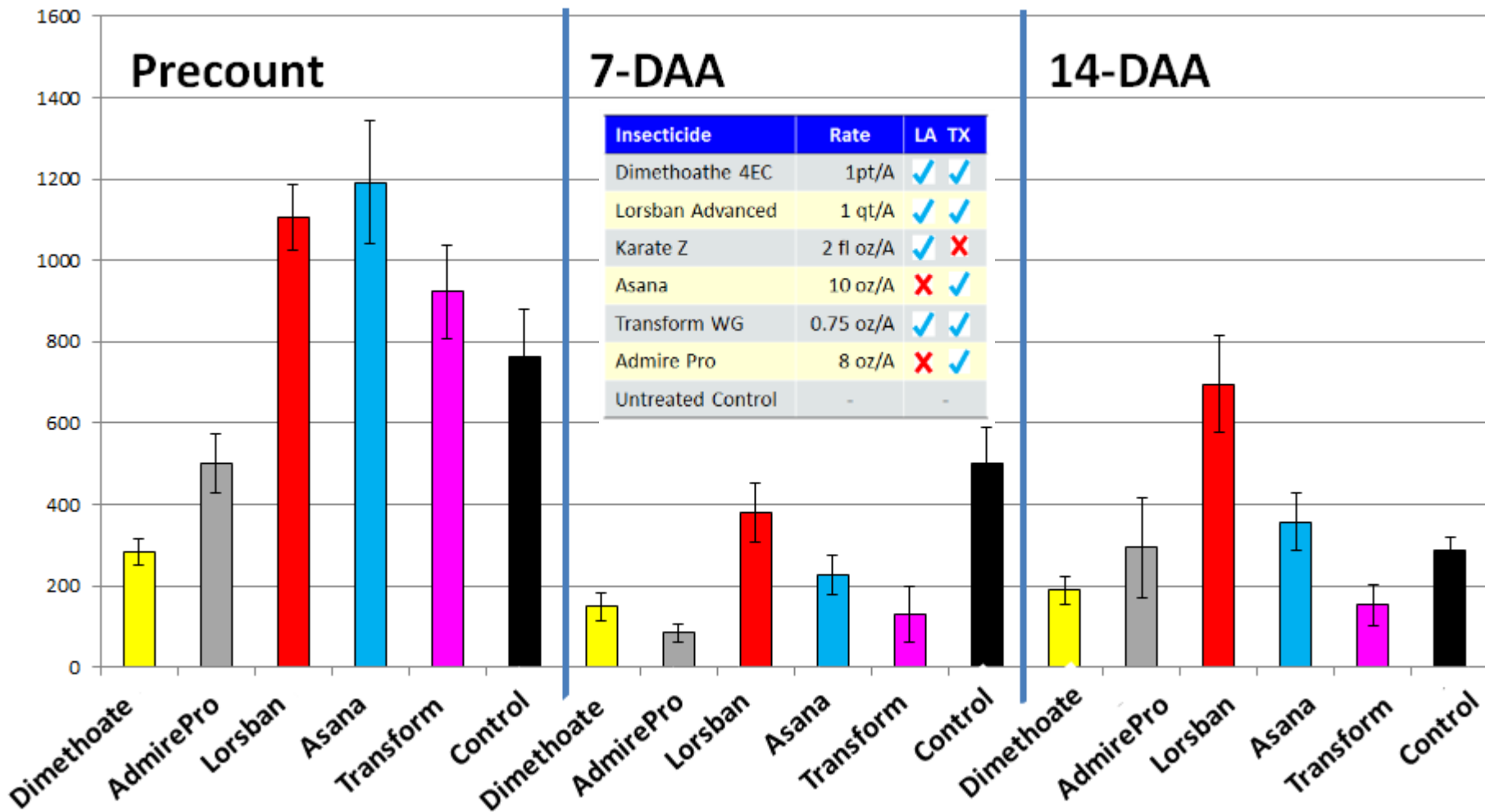
Insecticide test in China, nr Beaumont Dr. Mo Way August 2013

Field previously had been treated with Lorsban 4E: 2 or 3 times



Insecticide test in Weslaco, TX. Villanueva and Sekula Oct-Nov 2013

Field previously had been treated with 2 applications each of Warhawk® (2 pts/A), Prevathon® (2 pts/A) and Di-Syston® 8 (1.5 pts/A)



Summary

- The new aphid pest of sorghum is taxonomically indistinct to *M. sacchari*: might be a **new biotype** that switched hosts or **a new invasive species** recently introduced into the U.S.
- There are indications that this aphid **will persist** in the Lower Rio Grande Valley and nearby areas in Mexico, the Coastal Bend and other sorghum regions in the USA and Mexico
- Management should include **tolerant/resistant cultivars TX-2783** (?) or commercial lines
- **Dimethoate 4EC** at 1 pt/ac might provide adequate control. A Section 18 Emergency Exemption Label has been requested for **Transform WG** insecticide.
- Natural enemies are abundant however, their impact is unknown.

Acknowledgments

- **Beto Garza** who provided a lot of support in this program
- Drs. S. Armstrong, M. Brewer and M. Way collaborators in this program
- People under my program: Gabriela Esparza, Sergio Davila, Alma Olguin, Cedric Galvan, Daniel Garcia, Joe Zamora, Justin Wendell
- Thanks to industry for providing insecticide products.
- Many thanks to the **Texas Grain Sorghum Board, and United Sorghum Checkoff** for their encouragement to address this pest.
- Thanks to the **many grain sorghum producers** who first noticed damaged fields and invited us to their fields