



### Modern Chemical Era

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- ORGANOCHLORINES** 1940  
*DDT, endosulfan*
- ORGANOPHOSPHATES** 1946  
*phosdrin, dimethoate*
- CARBAMATES** 1956  
*Sevin, Lannate*
- FORMAMIDINES** 1965  
*Fundal, Galecron*
- PYRETHROIDS** 1972  
*Ambush, Pounce*

### Modern Chemical Era

- 1940-1990, 6 major classes of chemistry
- Since 1992:

- CHLORNOCTINYLS**  
*Admire, Provado*
- TRANSGENIC COTTON**  
*Bollguard*
- PYRROLES**  
*Alert*
- DIACYLHYDRAZINE- IGR**  
*Confirm, Intrepid*
- PYRIDINE IGR**  
*Knack*
- PYRIDINE AZOMETHIN**  
*Fulfill*
- THIADIAZINE IGR**  
*Applaud, Courier*
- MACROCYCLIC LACTONE**  
*Proclaim*
- SPINOSYNS**  
*Success*
- OXADIAZINE**  
*Avaunt, Steward*

### Routes of Activity

- Soil systemic
- Translaminar
- Ingestion / Contact
- Vapor/ Inhalation

### Selectivity of Reduced-Risk Products

	Worms	WF	LM	Beetles	Aphids	Thrips
Success	●●●		●●			●●●
Avaunt	●●●					
Confirm	●●●					
Intrepid	●●●					
Knack		●●●				
Courier		●●●				
Assail		●●●		●●	●	
Fulfill		●			●●	
Pyrethroid	●●●	●●●	●●●	●●●	●●●	●●●

### The Two Most Important Chemistries in Vegetables

#### Spinosyns



#### Chloronicotinyls



### Worm Management In Desert Head Lettuce Pre- 1997

	Stand Establishment		Post-thinning to Pre-heading			Heading to Harvest	
	Coty	2-4 lf	4-8 lf	9-14 lf	Pre-heading	Early Head	Head 2-4"
Lannate							
Larvin							
Orthene							
Endosulfan							
Bt, Cryolite							
Pyrethroids							

\*1995- BAW resistance to Lannate was documented in Yuma and La Paz counties.



### Worm Management In Desert Head Lettuce-2003

	Stand Establishment		Post-thinning to Pre-heading			Heading to Harvest	
	Coty	2-4 lf	4-8 lf	9-14 lf	Pre-heading	Early Head	Head 2-4"
Success							
Proclaim							
Avaunt							
Intrepid							
Confirm							
Lannate							
Larvin							
Orthene							
Endosulfan							

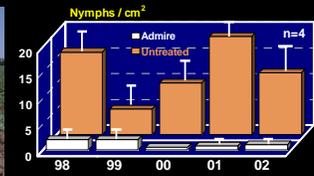
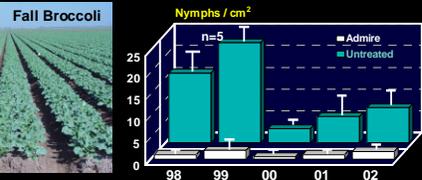
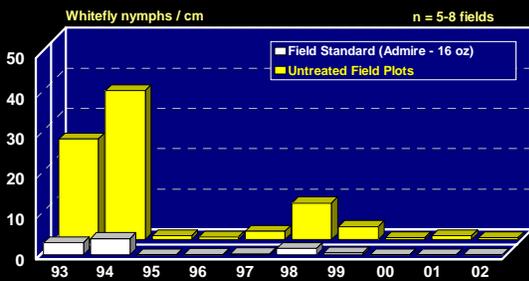
■ Stand-alone application  
 ■ Tank-mix application

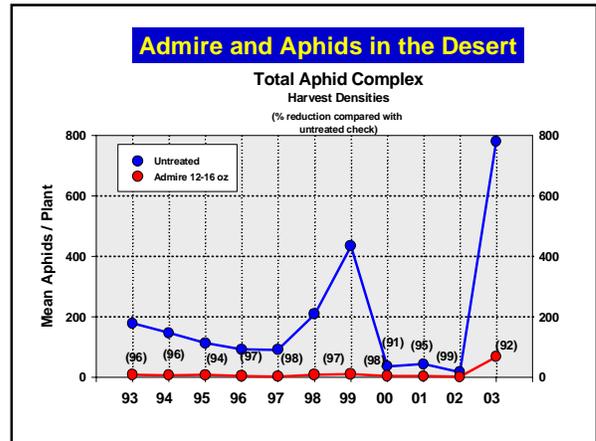
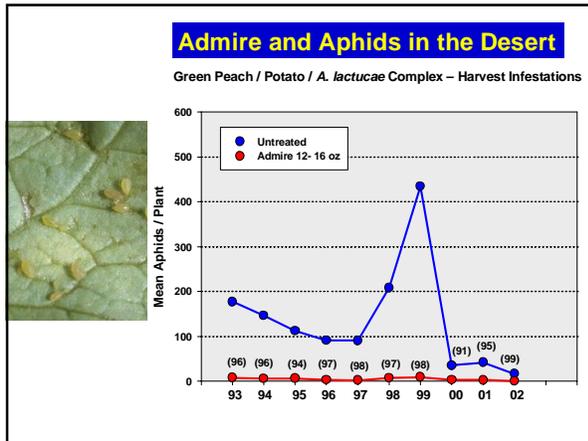
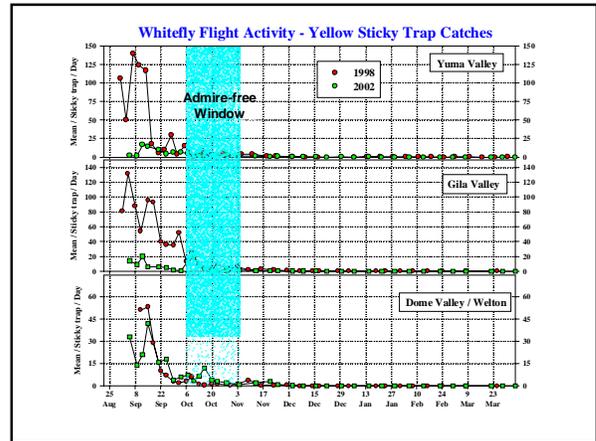
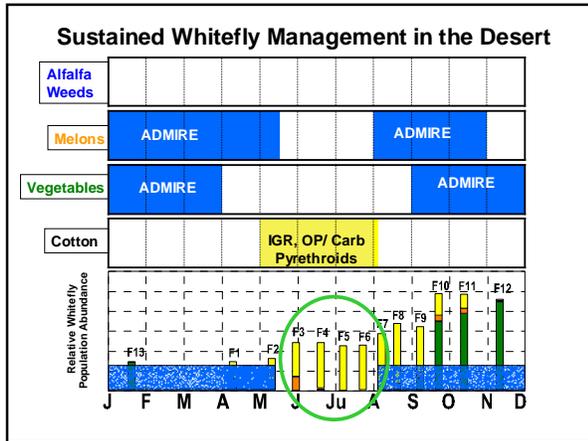
### 10 Years of Admire in The Desert



### Sustained Field Performance of Admire in Commercial Head Lettuce

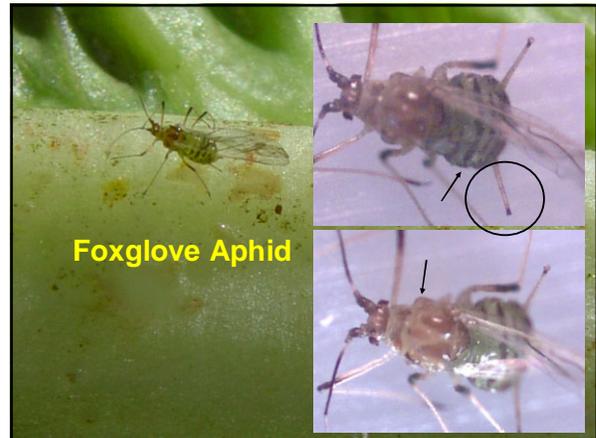
Yuma, Gila, & Dome Valleys

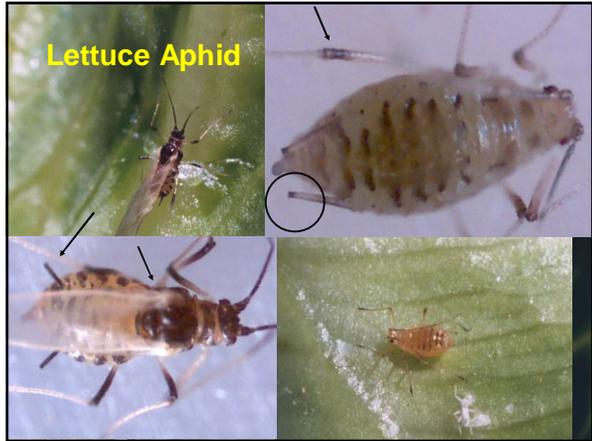




### What happened in 2003 ?

- **Mild Winter** – one of the warmest Januarys on record in Yuma.
- An increase winter / spring lettuce acreage not treated with Admire
- Emergence of the **Foxglove aphid** as a pest of lettuce

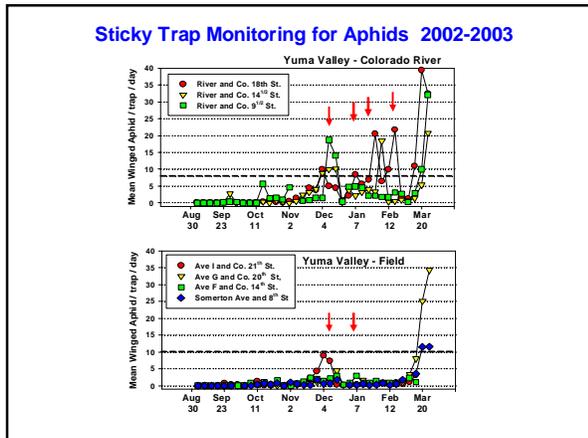
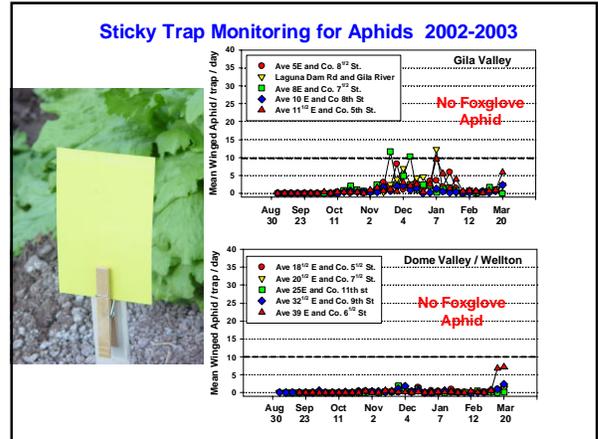






### Foxglove Aphid in Desert Lettuce

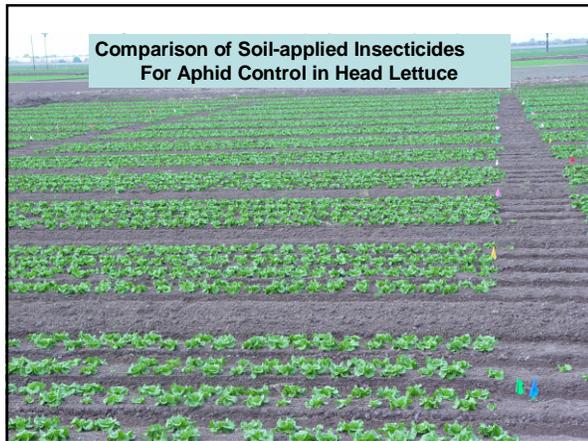
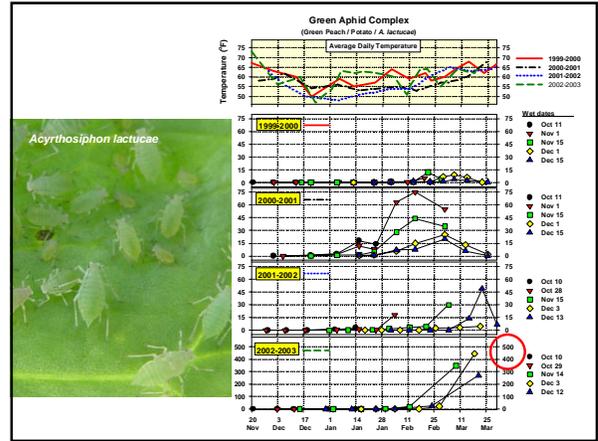
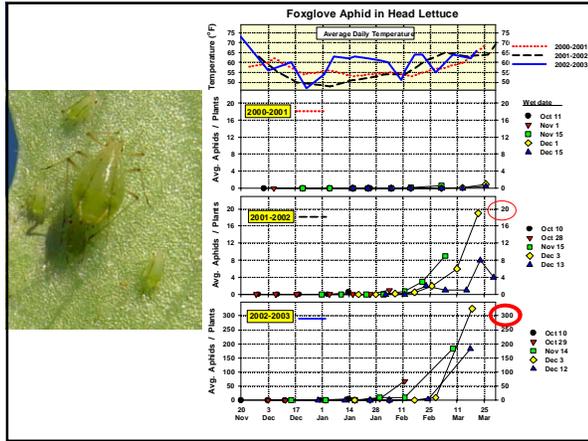
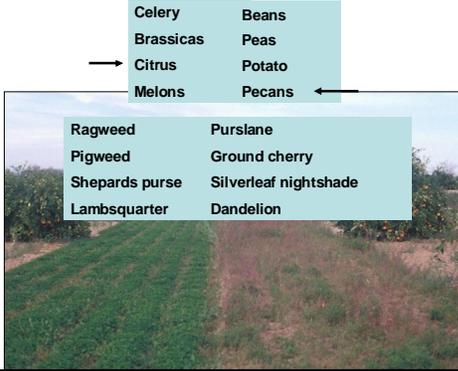
- Native to Europe, has been recorded on crops in Western US since 1940's, including CA.
- Has a wide host ranges, but primarily a pest of potatoes and ornamentals in greenhouse production.
- Jul 1998 - Found infesting head lettuce in Salinas.
- Jan 1999 - Lettuce aphid found on lettuce in desert.
- Mar 2001 - Found an unidentified aphid in untreated lettuce plots at YAC.
- Feb 2002 - Identified Foxglove in Yuma on untreated lettuce plots at YAC.



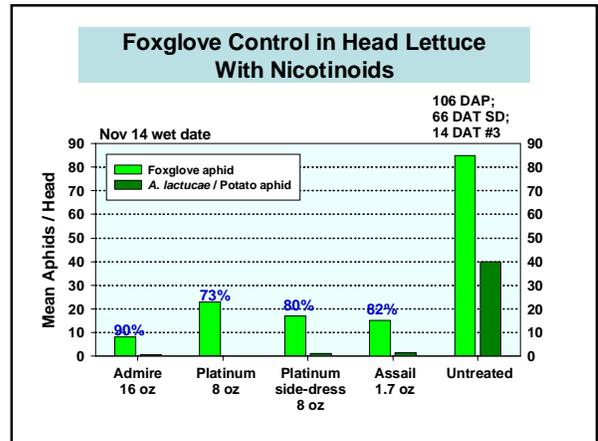
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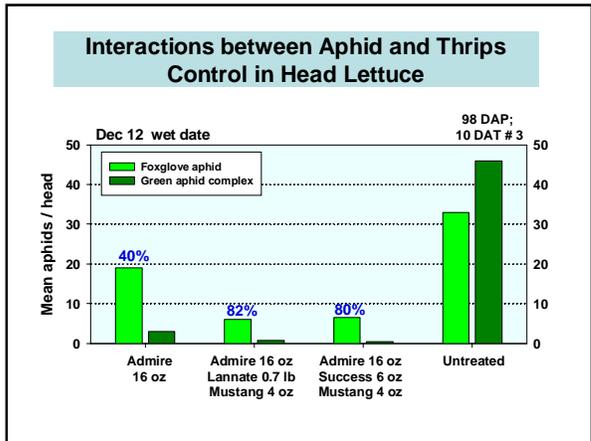
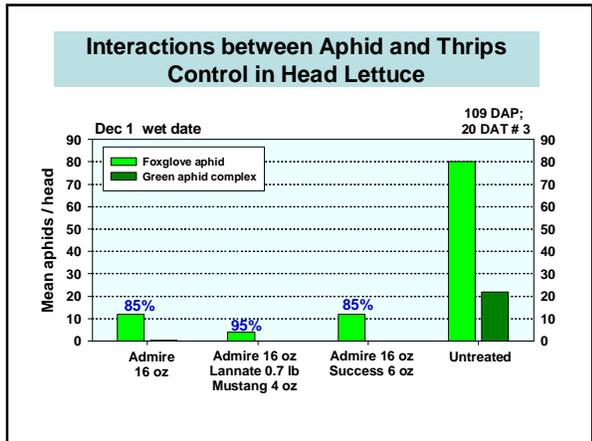
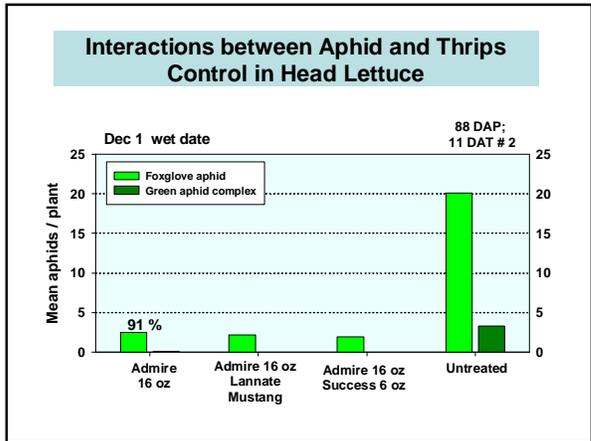
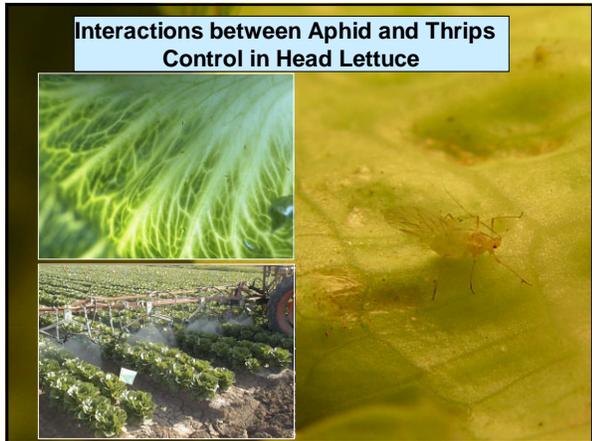
- Nov 2002: First Foxglove aphids found colonizing untreated head lettuce in Yuma Valley .
- Jan 2003: Light infestations on numerous untreated fields in Yuma Valley.
- Feb 2003: Found on organic lettuce in Bard, CA and Algodones, Mexico .
- Feb 2003: Found colonizing mature head lettuce and Romaine treated with Admire in Yuma Valley.
- Winter 2004: ?

**Will Foxglove Aphid Continue to be a Desert Pest?**

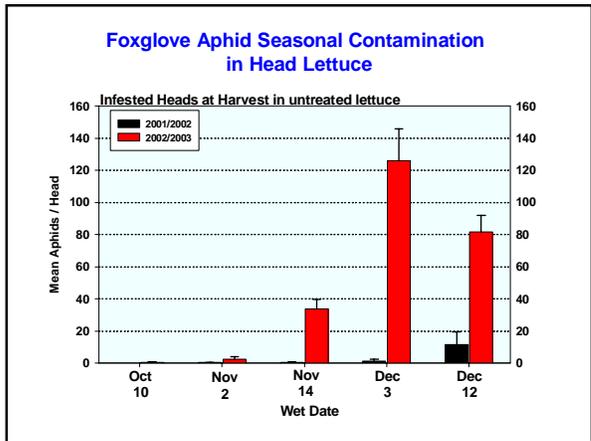


**Comparison of Soil-applied Insecticides For Aphid Control in Head Lettuce**





- ### Considerations for Foxglove Control in Desert Lettuce
- Begin scouting for aphids in October; be aware of fields adjacent to citrus / houses.
  - Consider closing the Admire-free window earlier : late October in Yuma Valley.
  - Apply a minimum of 16 oz of Admire in October / early November plantings.
  - Increase rates of Admire to 20 oz or > in mid November – December plantings

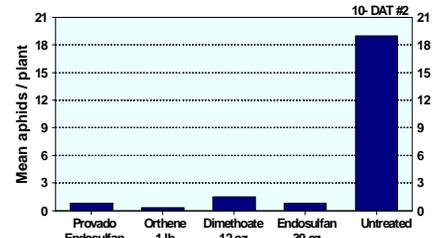


### Considerations for Foxglove Control in Desert Lettuce

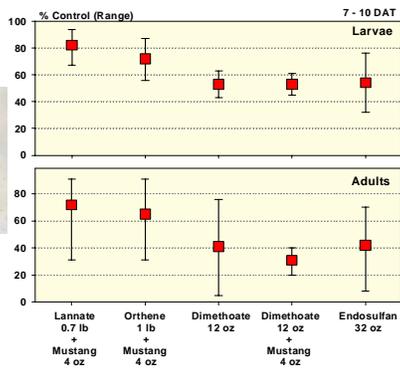
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- Apply a minimum of 16 oz of Admire in October / early November plantings.
- Increase rates of Admire to 20 oz or > in late plantings: mid November – December.
- Incorporate foliar aphicides into your thrips program – Orthene, dimethoate, endosulfan

### Foliar Efficacy Against Foxglove Aphid in Desert Lettuce

YAC, Spring 2003



### Thrips Control in Head Lettuce



[ag.arizona.edu/crops/](http://ag.arizona.edu/crops/)



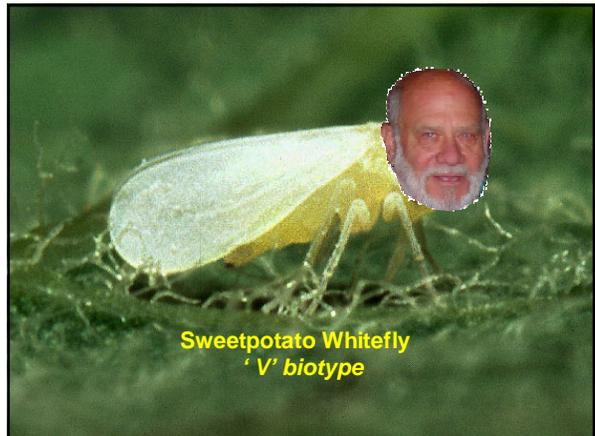
Sweetpotato whitefly  
*Bemisia tabaci*

A – biotype

B – biotype

Silverleaf whitefly  
*B. argentifolii*

Sweetpotato whitefly  
Q – biotype



Sweetpotato Whitefly  
'V' biotype