THE UNIVERSITY OF ARIZONA
COLLEGE OF AGRICULTURE AND LIFE SCIENCES

Title: ***Fall Pest Management Meeting***

Sponsor: ***University of Arizona***

Date: ***8-11-04***

Location: ***Yuma Civic and Convention Center***

THE UNIVERSITY OF ARIZONA
COLLEGE OF AGRICULTURE AND LIFE SCIENCES

Fall Produce Insect Pest Management Review

John C. Palumbo

Whiteflies

Aphid Complex

I. Review of 2003/2004

II. Research and New Products

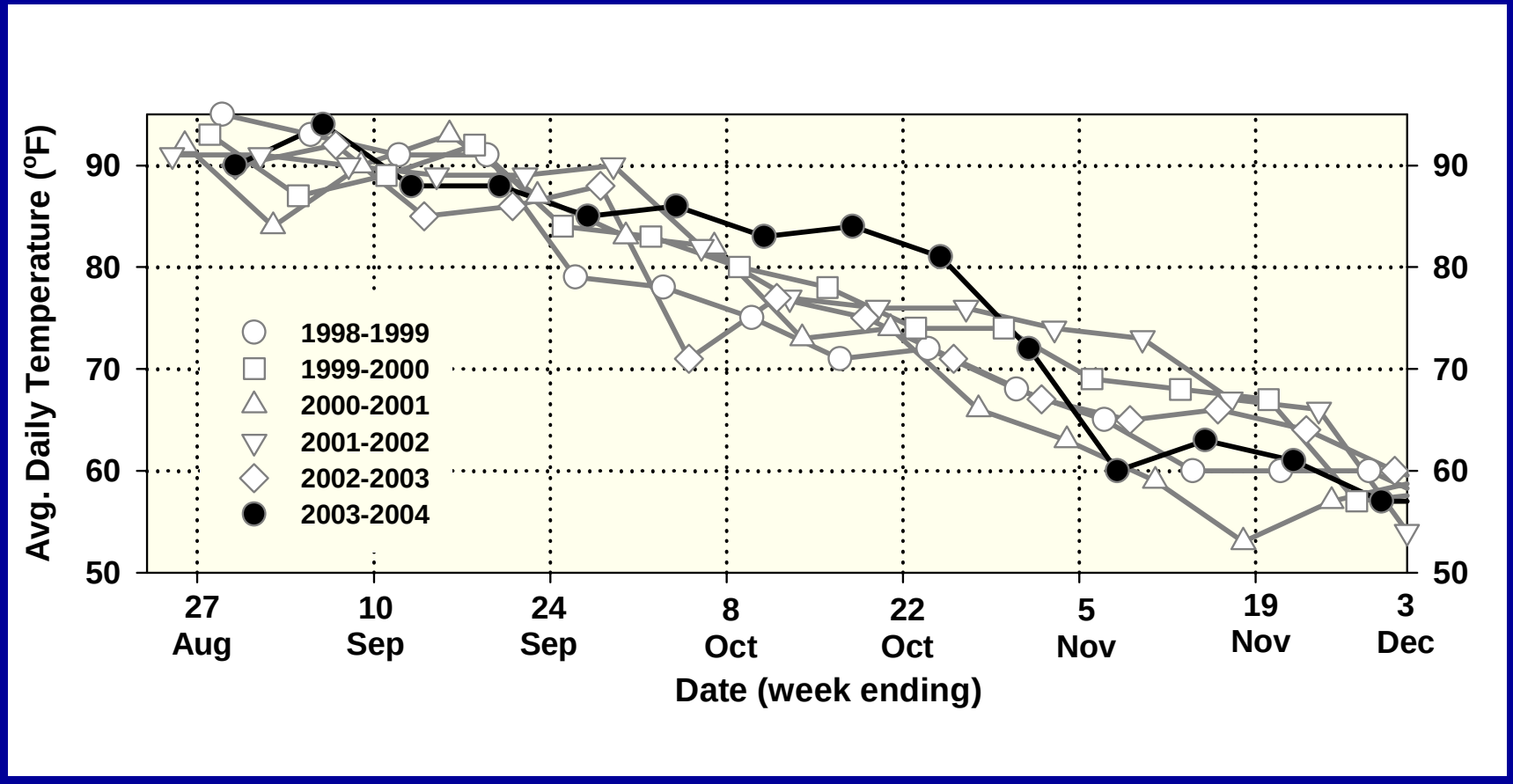
III. Recommendations

Worm Complex

Thrips

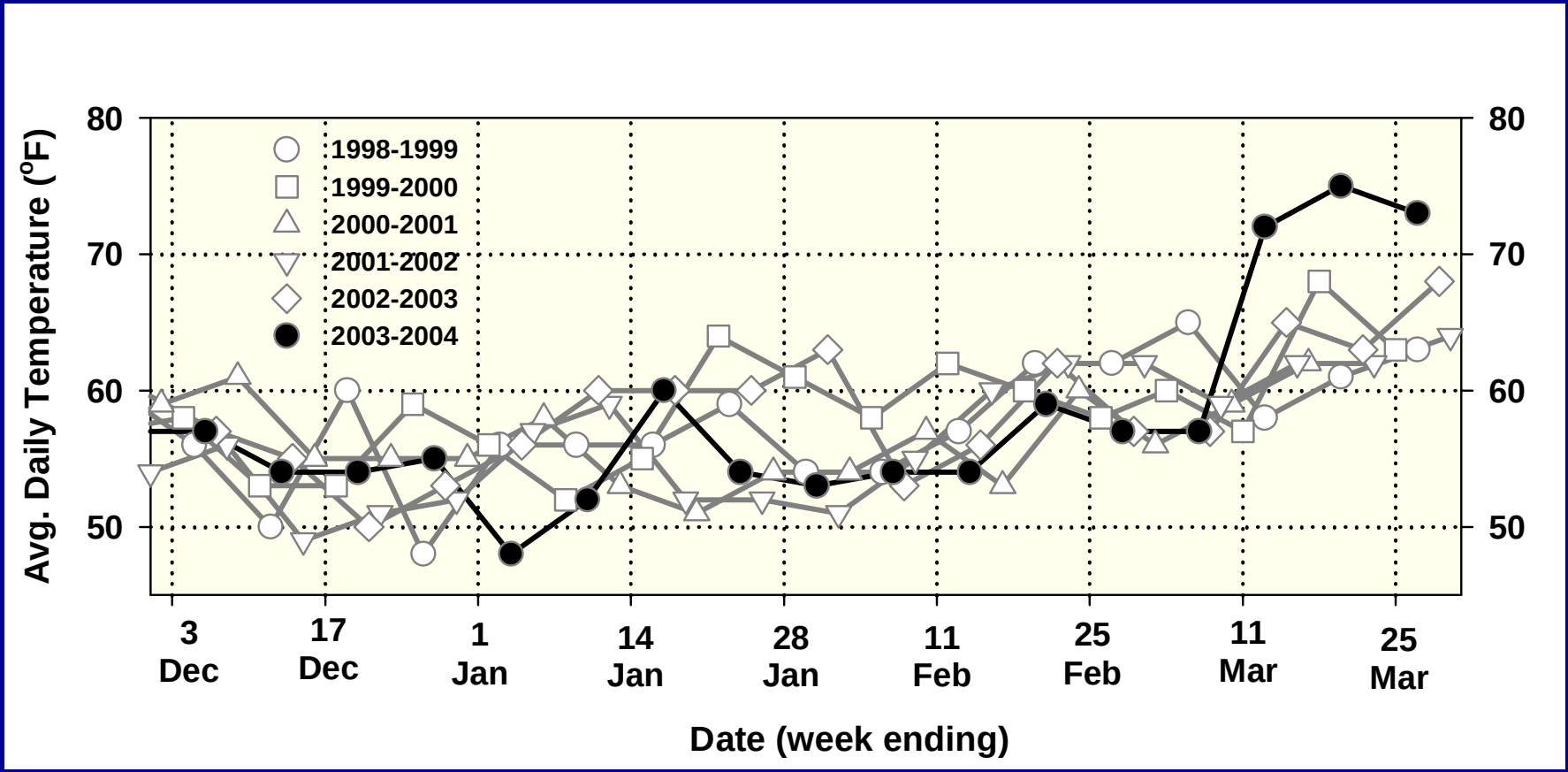
Fall / Winter Temperatures

Yuma Valley - AZMET



Winter / Spring Temperatures

Yuma Valley - AZMET



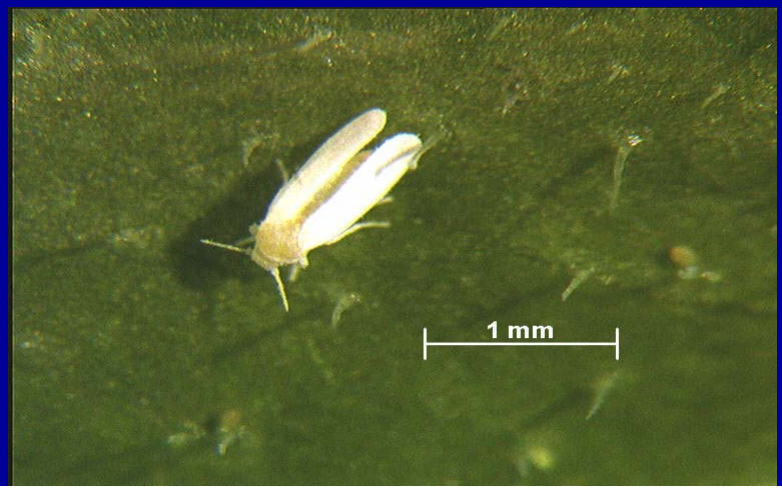
Seasonal Rainfall

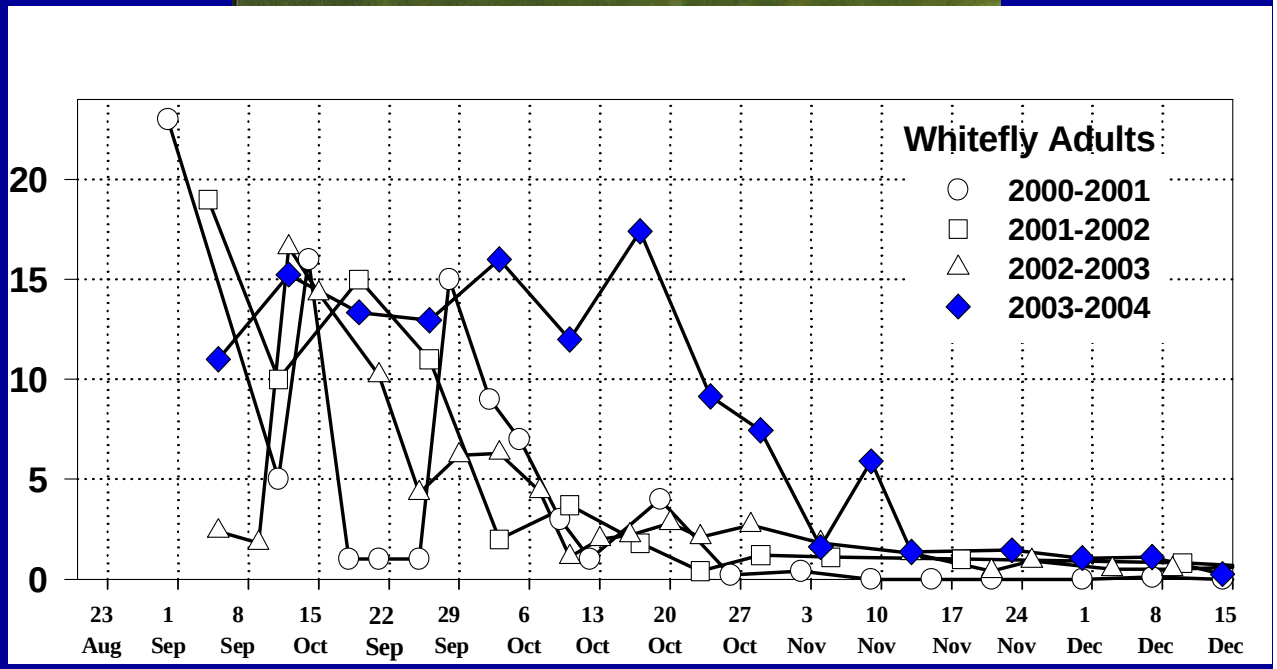
Yuma Valley - AZMET

Avg Seasonal Rainfall (in.)

Yr	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Avg.
98-99	1.01	0	0.26	0.05	0	0.53	0	1.85
99-00	0.80	0	0	0	0	0.05	0.21	1.06
00-01	0.02	0.63	0	0	0.31	0.02	2.54	**3.52**
01-02	0	0.10	0.01	0.01	0	0	0	0.12
02-03	0.02	0	0.02	0	0	0.57	0.64	1.25
03-04	0.05	0	0.40	0	0.10	0.20	0.10	0.85
Avg.	**1.9**	0.73	0.69	0.06	0.41	1.37	**3.49**	

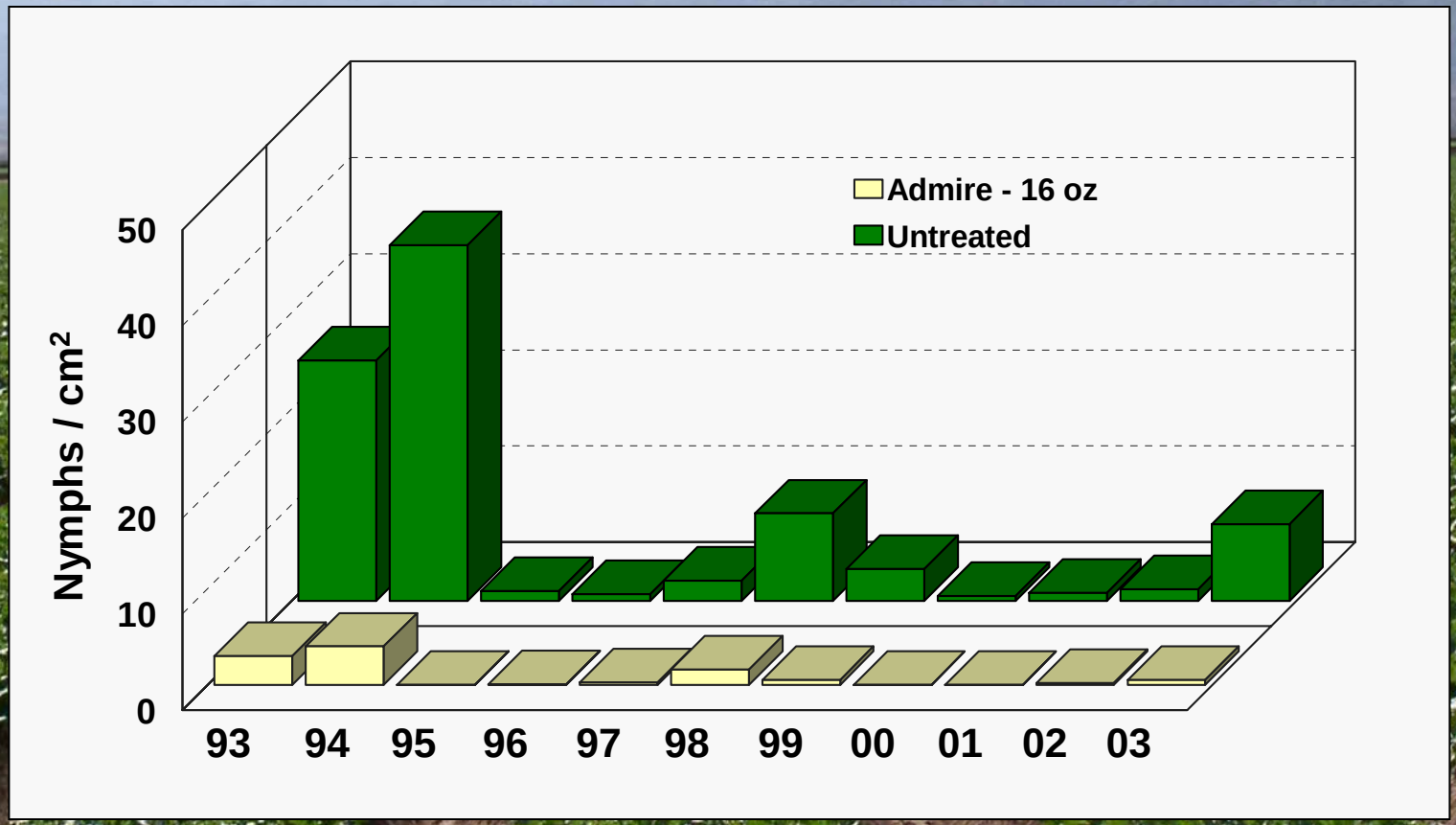
Silverleaf Whitefly



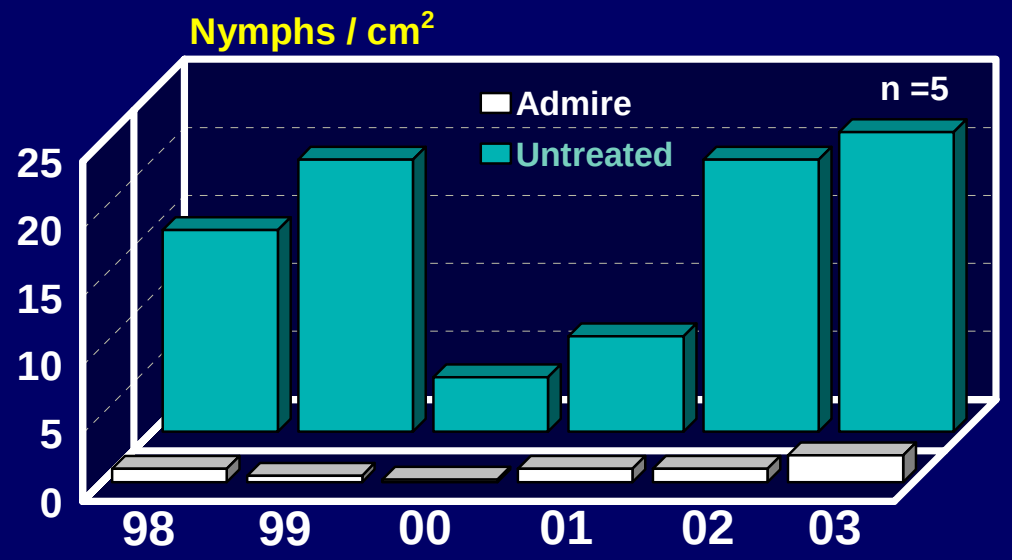


Field Performance of Admire in Commercial Lettuce

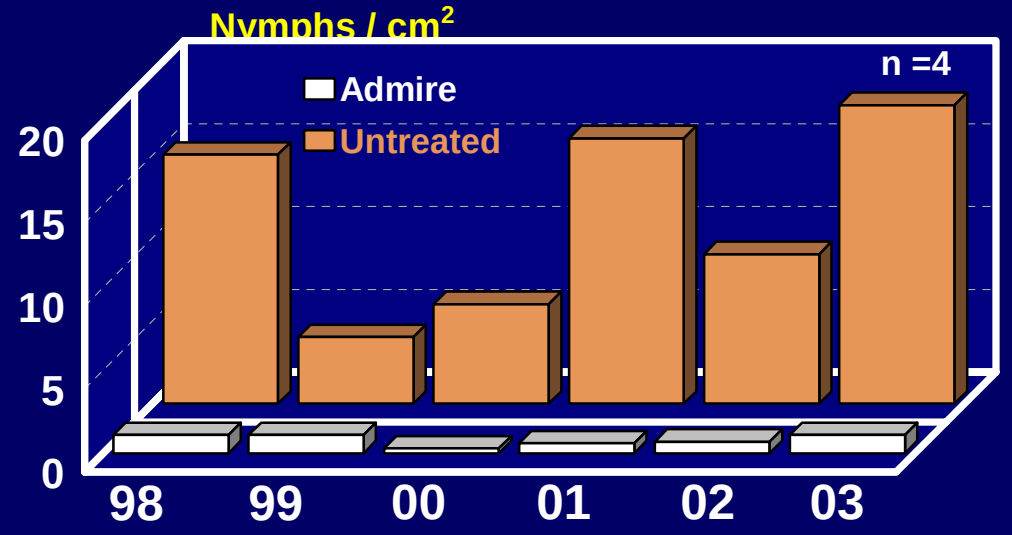
Yuma, Gila, & Dome Valleys



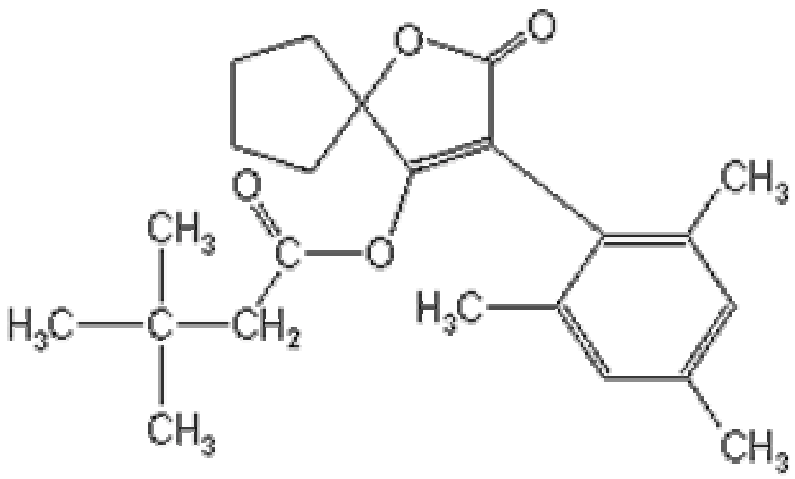

Fall Broccoli


Nymphs / cm2
n =5
Admire
Untreated
25
20
15
10
5
0
98
99
00
01
02
03


Fall Cantaloupes


Nymphs / cm2
n =4
Admire
Untreated
20
15
10
5
0
98
99
00
01
02
03

Oberon®



Spiromesifen (BSN 2040)

A new IGR like compound from *Bayer Crop Sciences.*

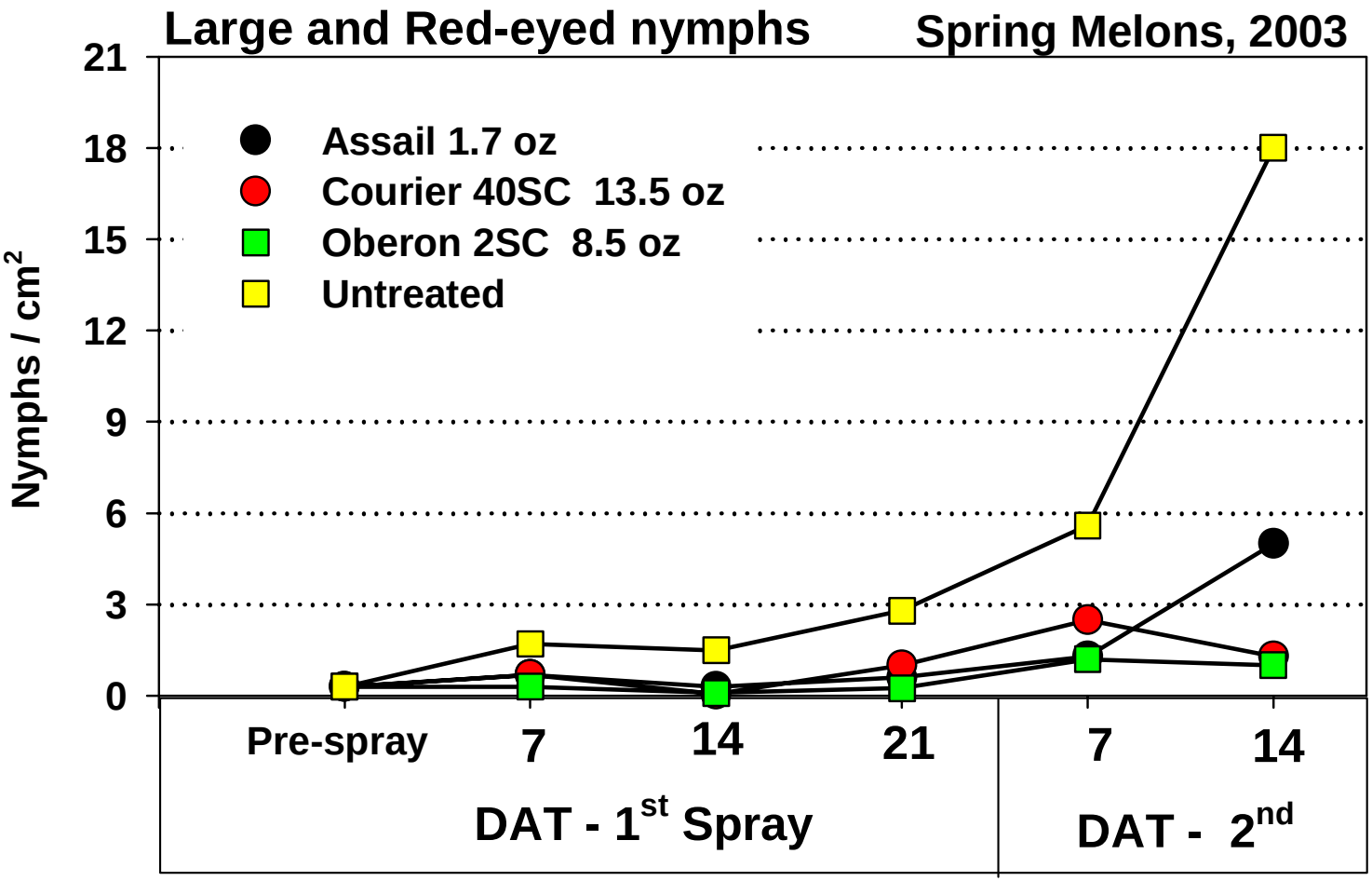
Inhibits lipid biosynthesis.

Foliar contact activity against whiteflies and mites.

Highly effective on nymphs and pupal stage.

Considered harmless to pollinators .

Excellent IRM tool.


Large and Red-eyed nymphs
Spring Melons, 2003
Nymphs / cm2
21
18
15
12
9
6
3
0
Assail 1.7 oz
Courier 40SC 13.5 oz
Oberon 2SC 8.5 oz
Untreated
Pre-spray
7
14
21
7
14
DAT - 1st Spray
DAT - 2nd

Management Options

Admire 16-20 oz

- 1.5 to 2 “ below seed line
- 10-20 gpa

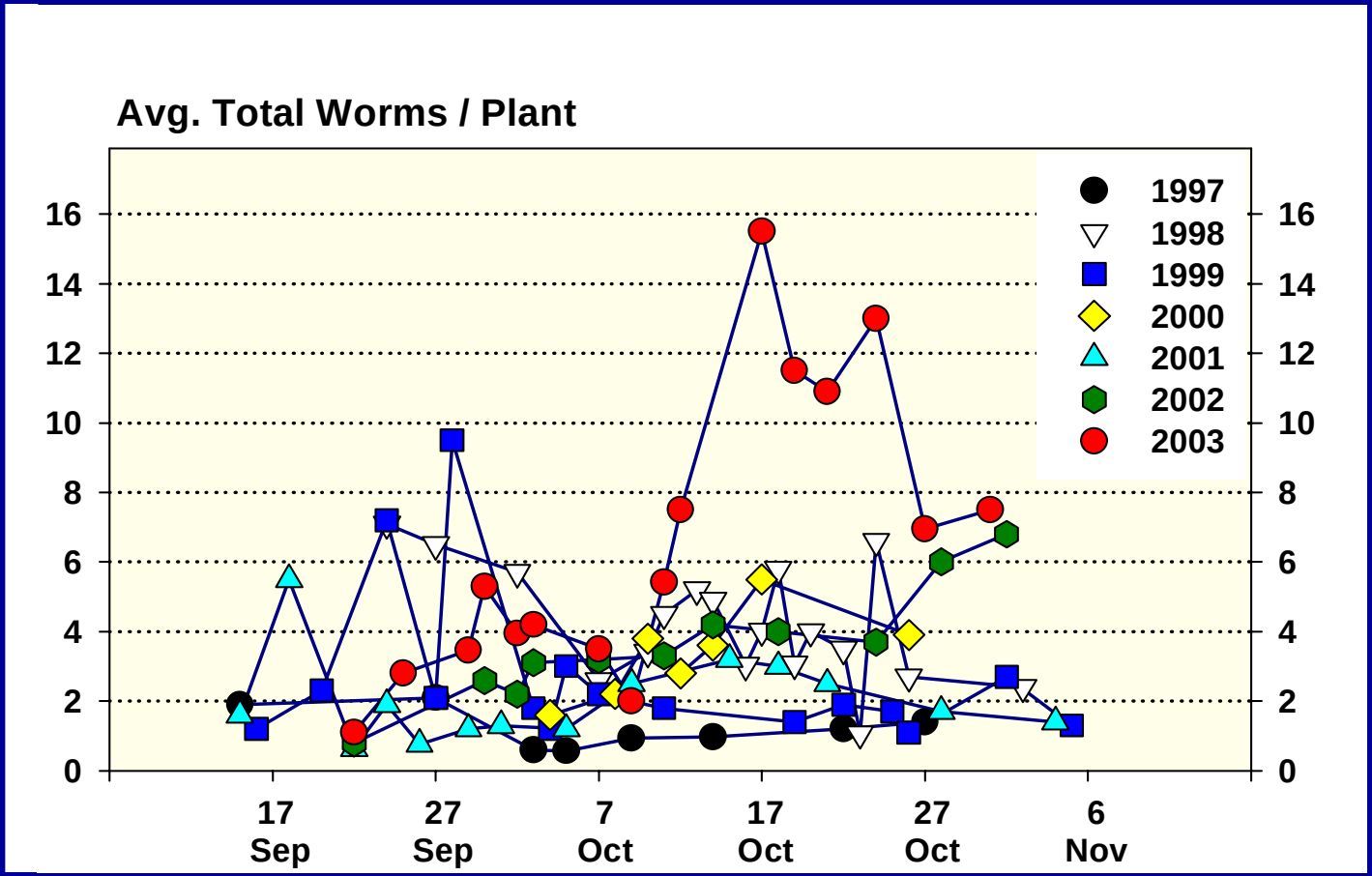
Pyrethroid combinations

- Capture, Danitol
- Orthene
- Endosulfan
- Provado


LIBERTY
IN GOD WE TRUST

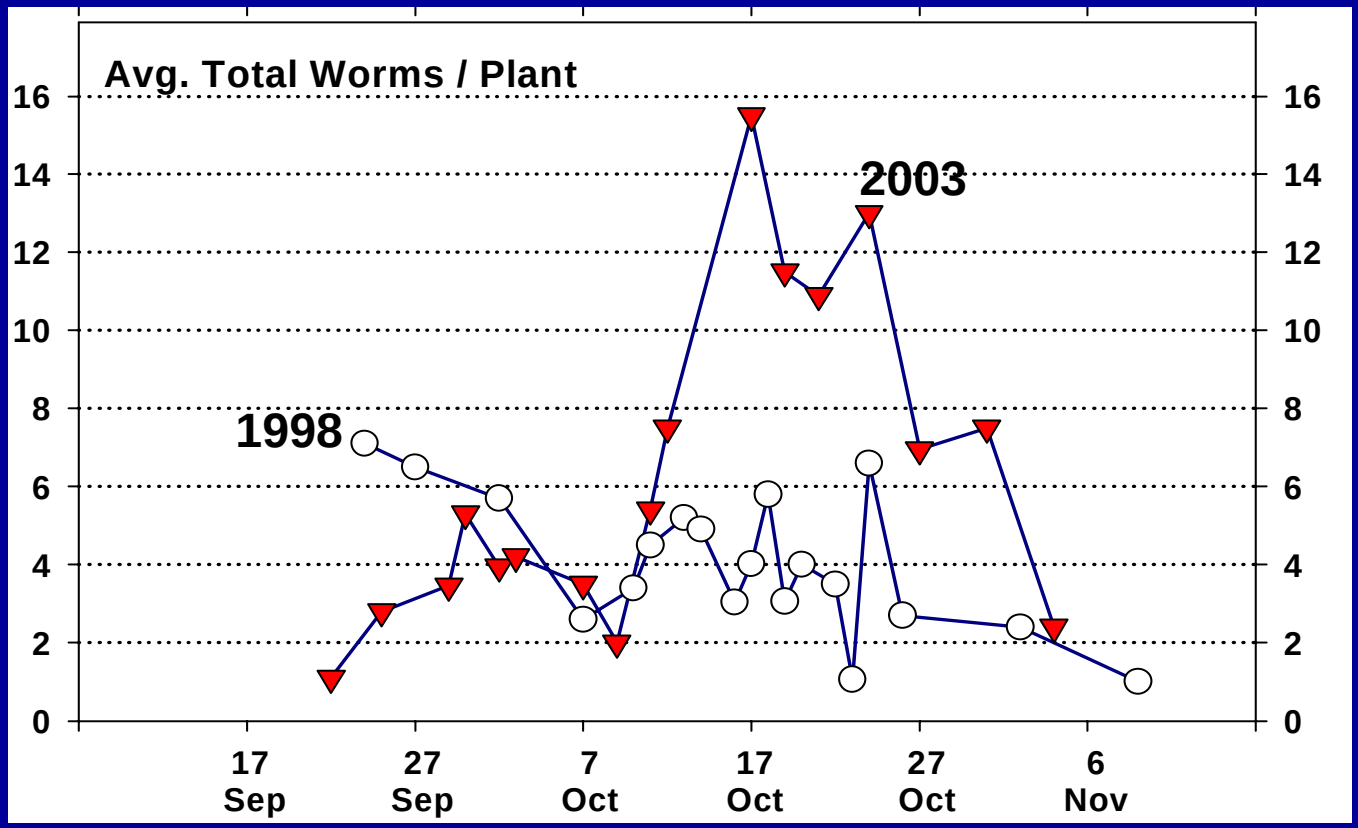
BAW and CL Populations in Untreated head Lettuce

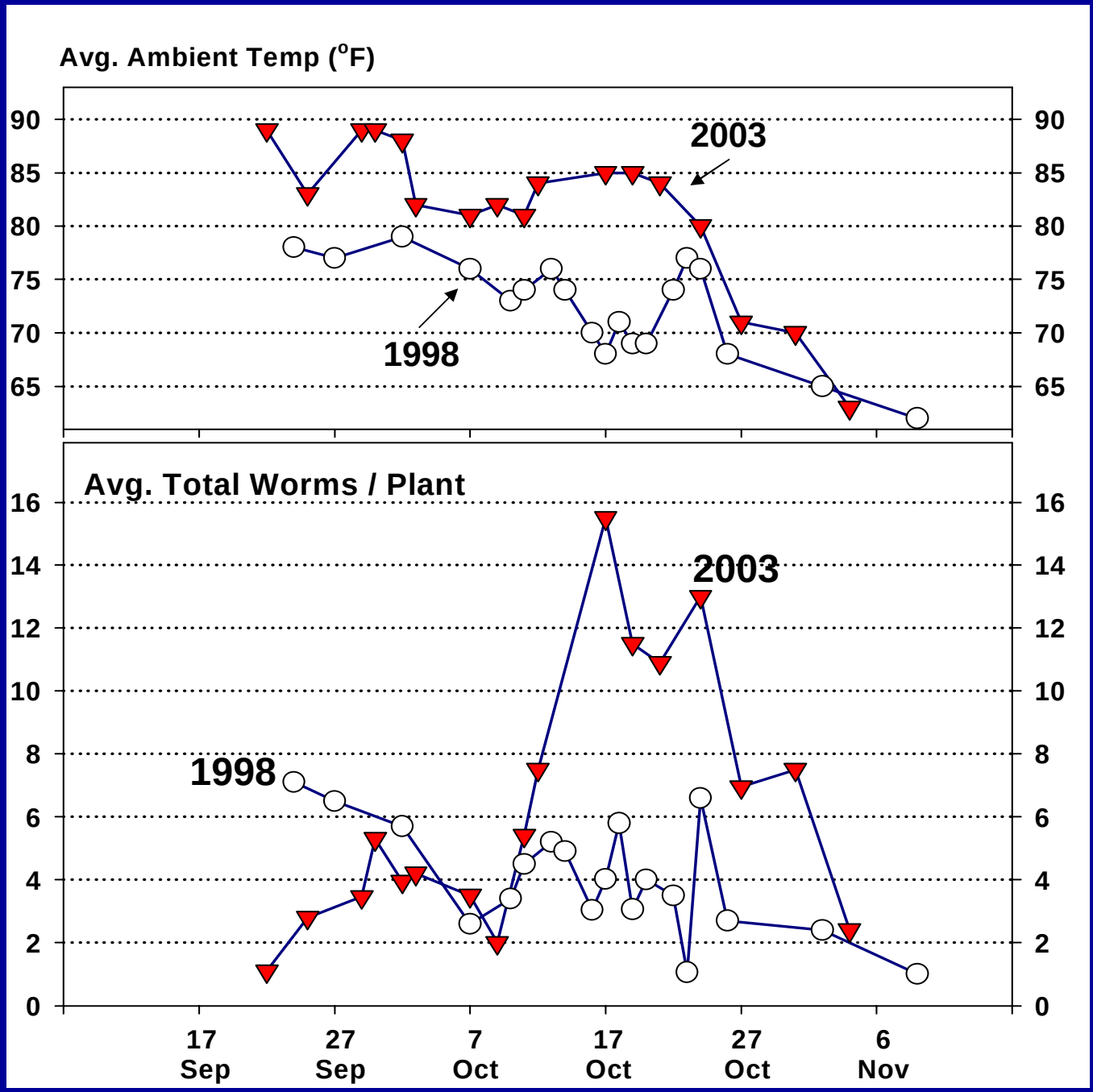
Yuma Ag Center



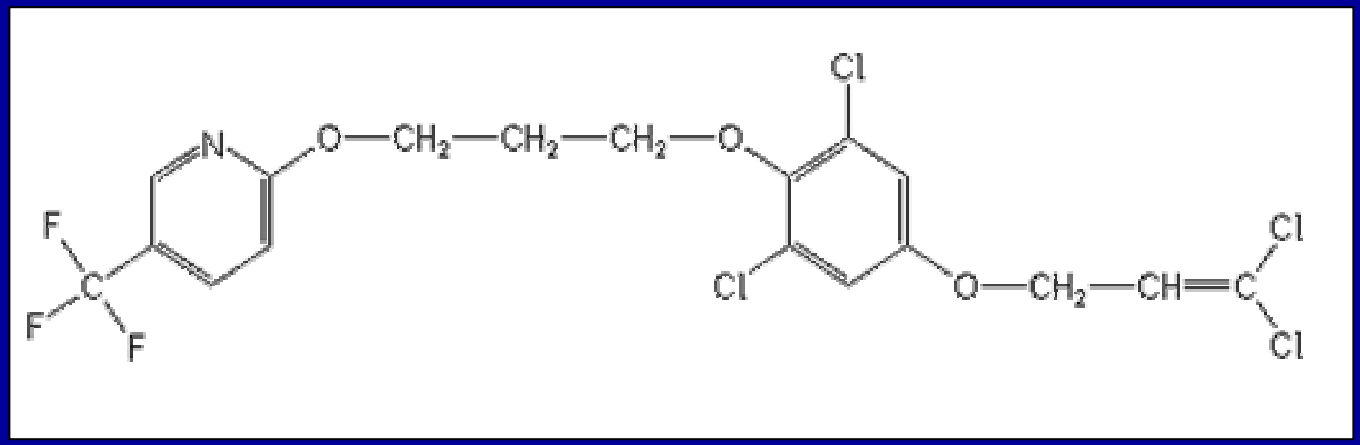
BAW and CL Populations in Untreated head Lettuce

Yuma Ag Center




Avg. Ambient Temp (°F)
90
85
80
75
70
65
2003
1998
Avg. Total Worms / Plant
16
14
12
10
8
6
4
2
0
2003
1998
17 Sep
27 Sep
7 Oct
17 Oct
27 Oct
6 Nov

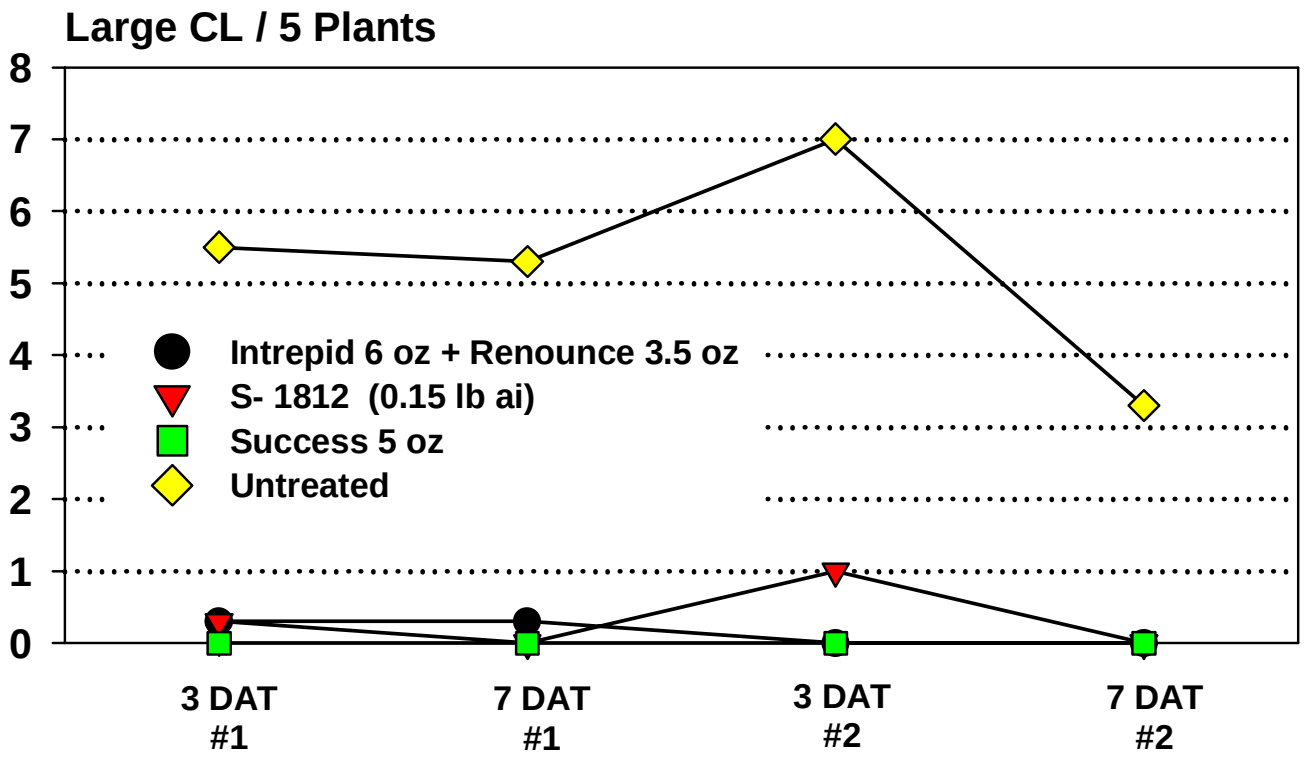
Pyridalyl (S-1812)



- A new chemistry, active on worms
- Unknown Mode of Action
- Translaminar activity / contact and Ingestion
- Considered an OP replacement (EPA)

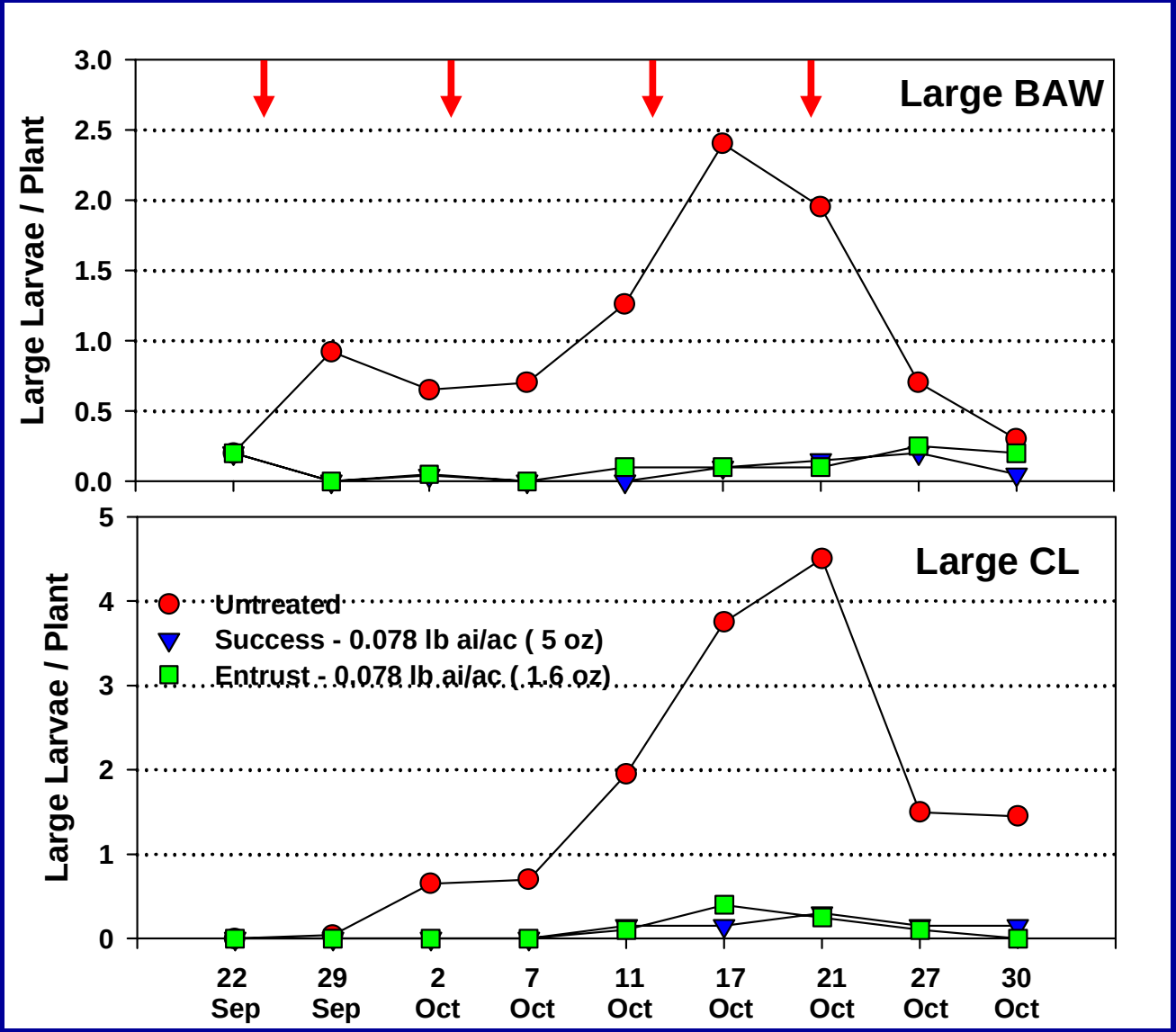
Pyridalyl (S-1812)

Fall 2003 – Head Lettuce




ORGANIC FARM
DO NOT SPRAY
RANCHO ORGANICO
NO ROCIE
TANIMURA & ANTLE
Dow AgroSciences
Entrust*
Naturalyte* Insect Control
*Trademark of Dow AgroSciences LLC

Entrust vs. Success in Lettuce



Dow AgroSciences

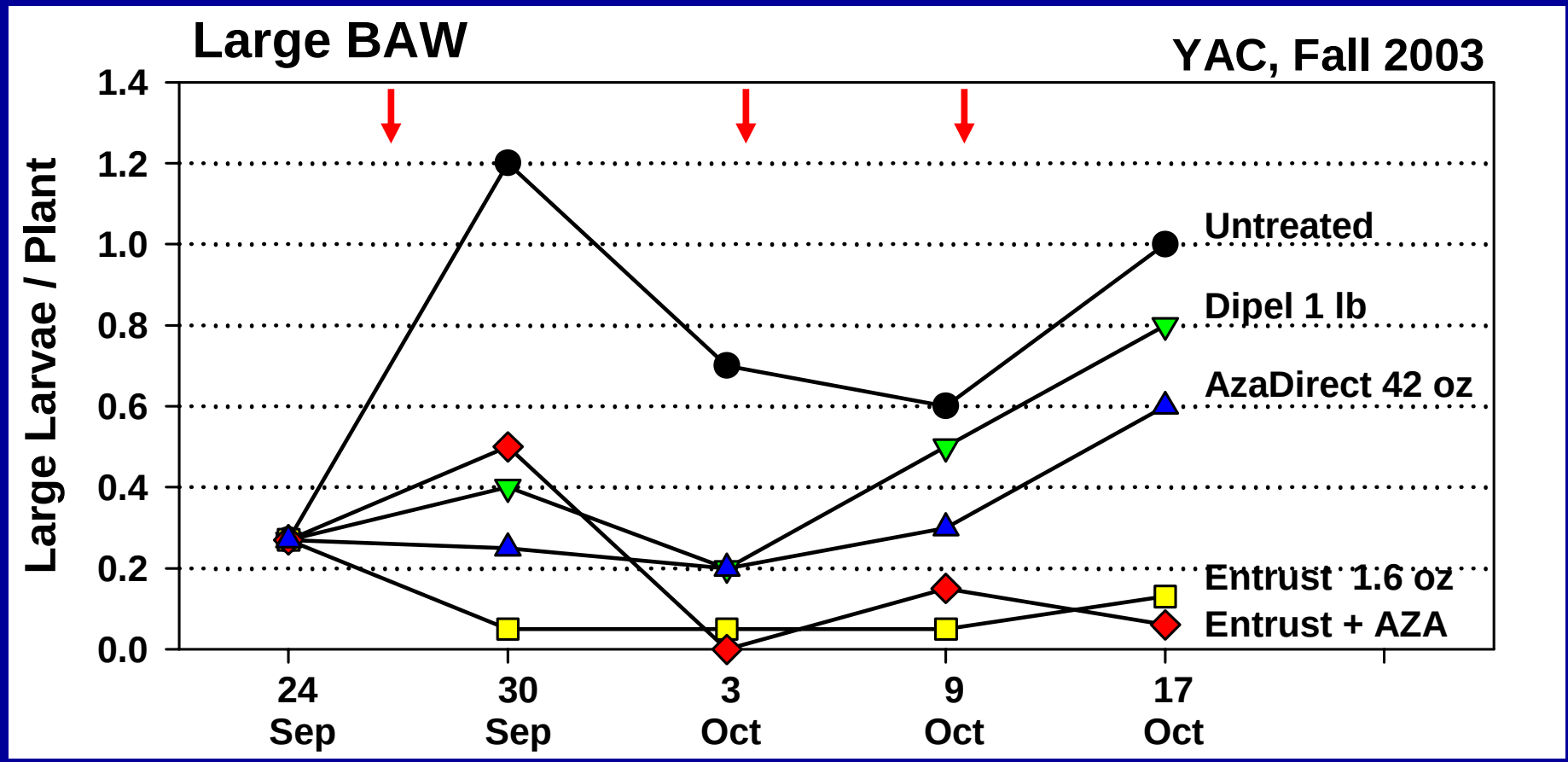
Entrust*

Naturalyte* Insect Control

*Trademark of Dow AgroSciences LLC

Interaction between Entrust and Aza-Direct

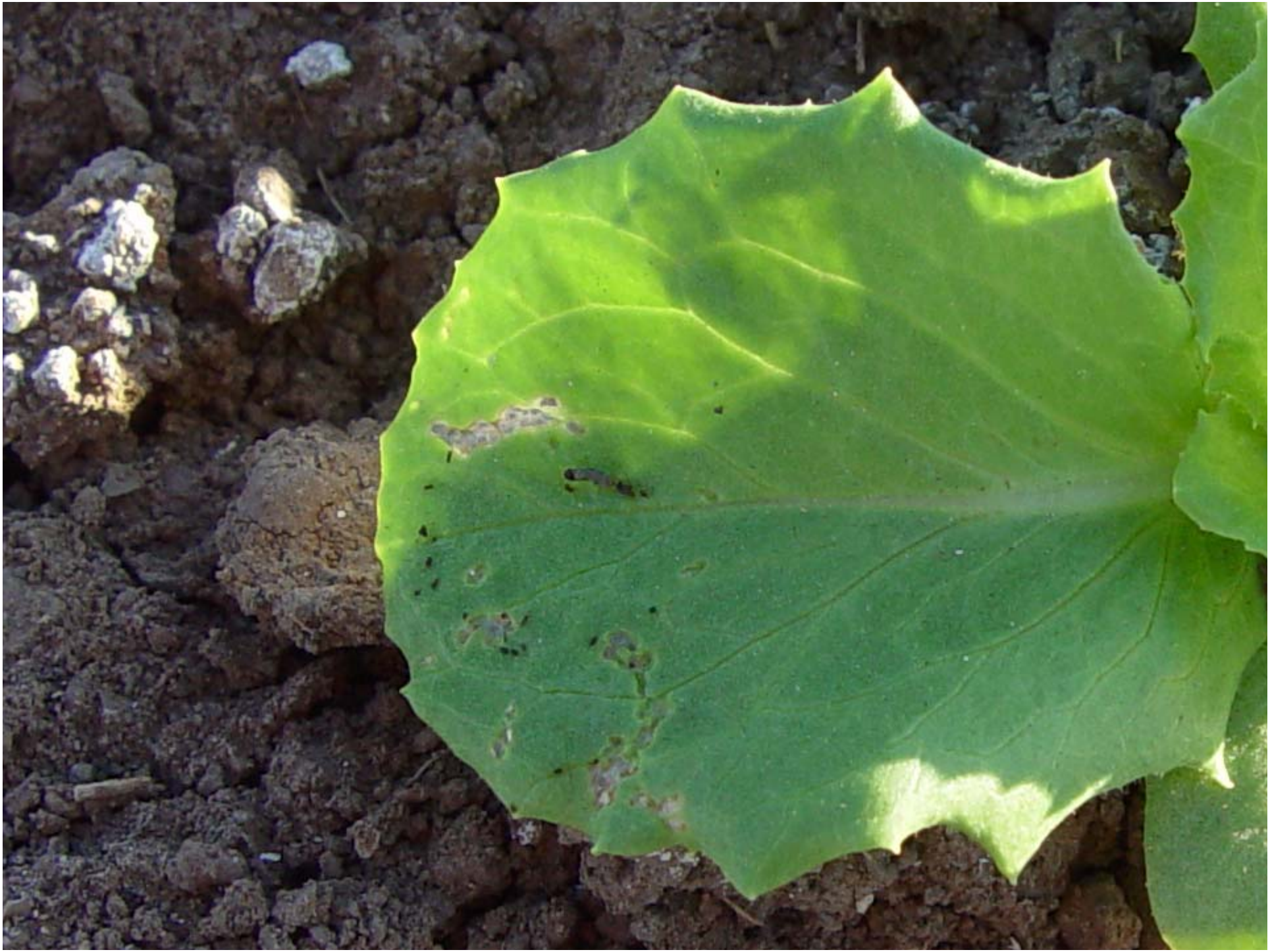
Trial 1



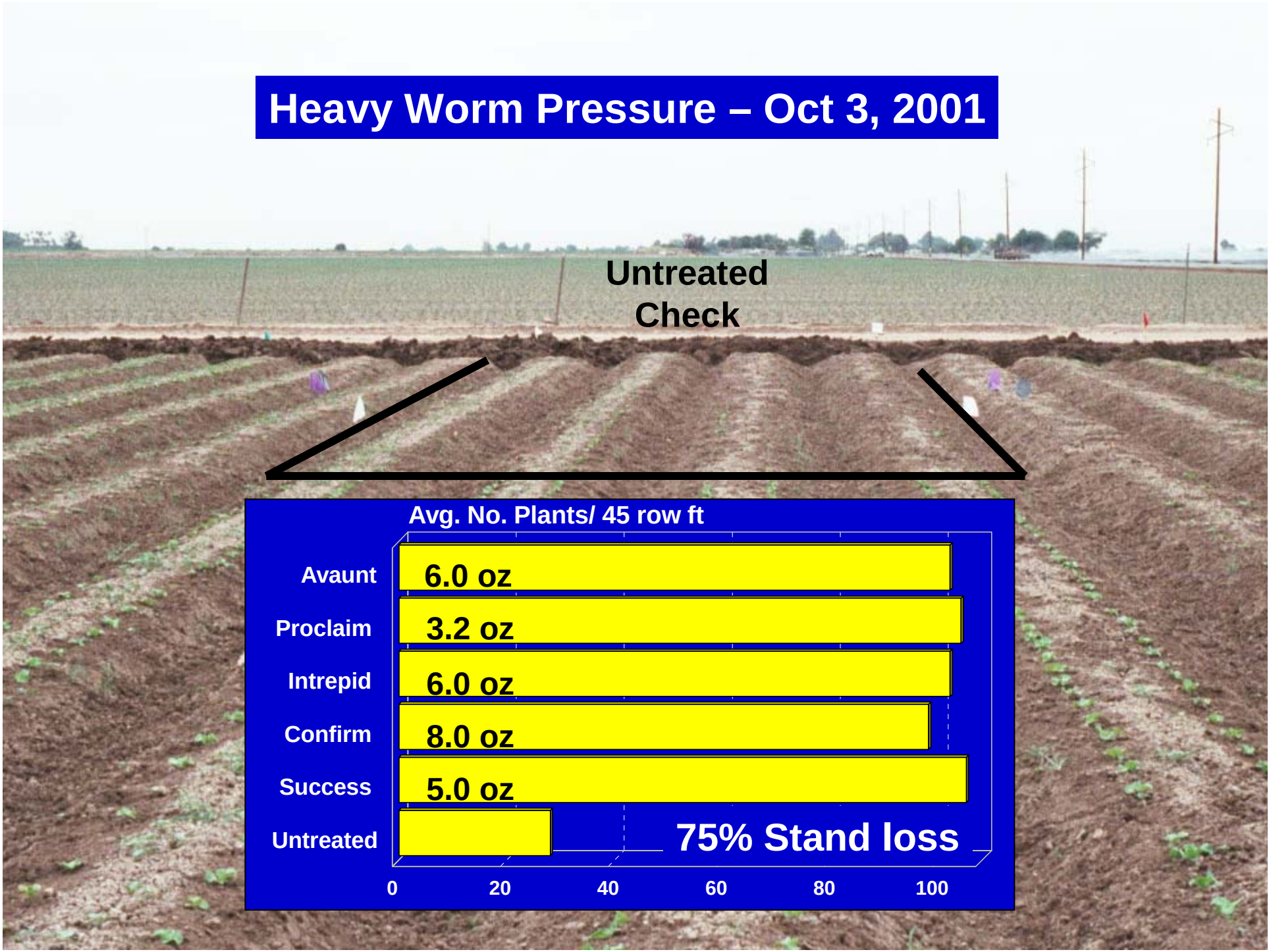
- Effective, Residual control
- Environmentally soft
- Short REI and PHI
- Selective Activity
- Unique modes of action

Lep-Specific Activity

Intrepid	*Avaunt*	Proclaim	Success
★★★	★★	★★★	★★★
★★	★★★	★★	★★★
★★	★★	★★★	★★★



Heavy Worm Pressure – Oct 3, 2001



Factors Influencing Worm Control

- **Spray applications**
  - ~ Coverage / Deposition
  - ~ Adjuvants (+ or -)
  - ~ Rates
- **Weather conditions**
  - ~ wind
  - ~ rain
  - ~ dew
  - ~ temp/sunlight
- **Plant growth parameters**
- **Insect pressure**

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"*	*Head >4"*
Success	■	■	■	■	■	■	▒	▒
Proclaim	■	■	■	■	■	■	▒	▒
Avaunt			■	■	▒	▒		
Intrepid			■	■	▒	▒		
Lannate	▒	▒	▒	▒	▒	▒	▒	▒
Larvin			▒	▒	▒			
Orthene Endosulfan			▒	▒				

■ **Stand-alone worm control**

▒ **Tank-mix application**

Desert Aphid Complex

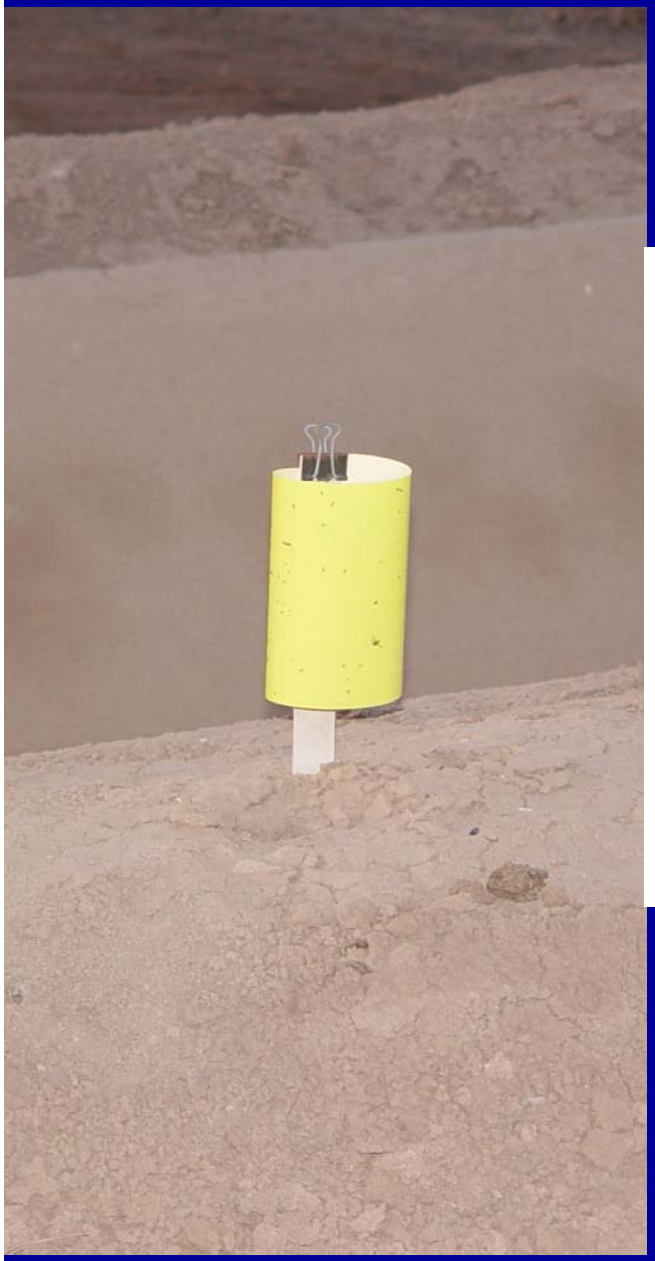
Green peach aphid
Myzus persicae

Potato aphid
Macrosiphum euphorbidae

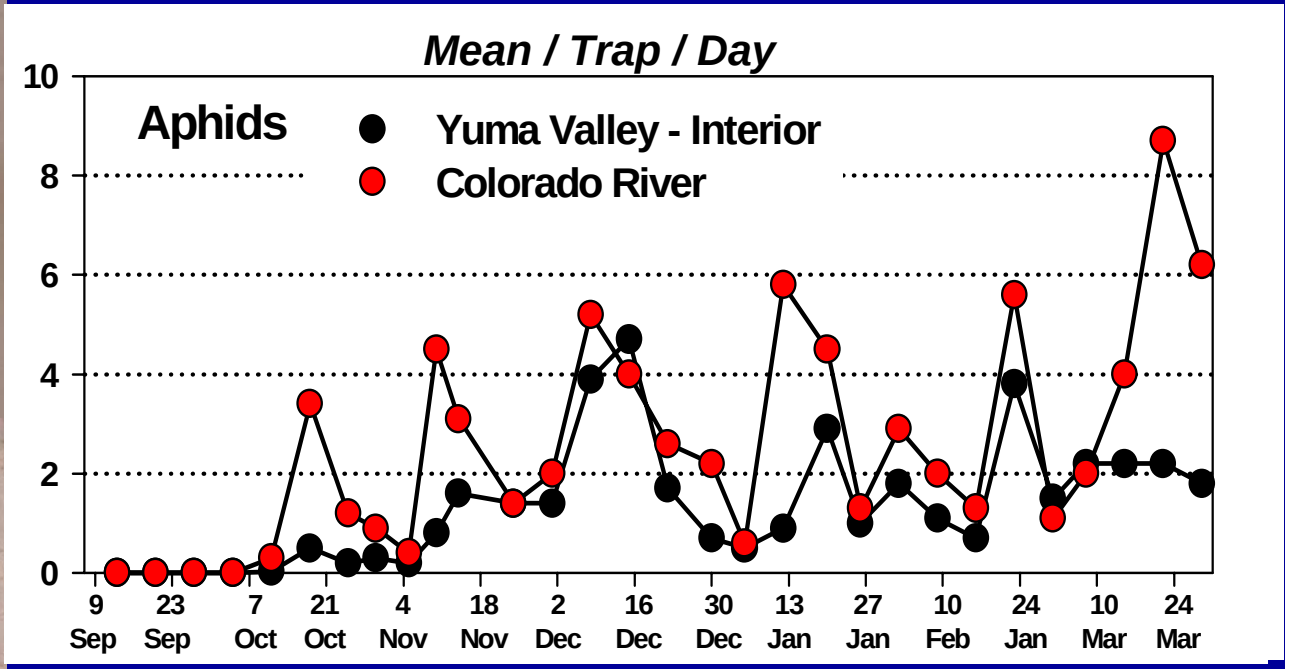
Acyrthosiphon lactucae

Foxglove Aphid
Aulacorthum solani

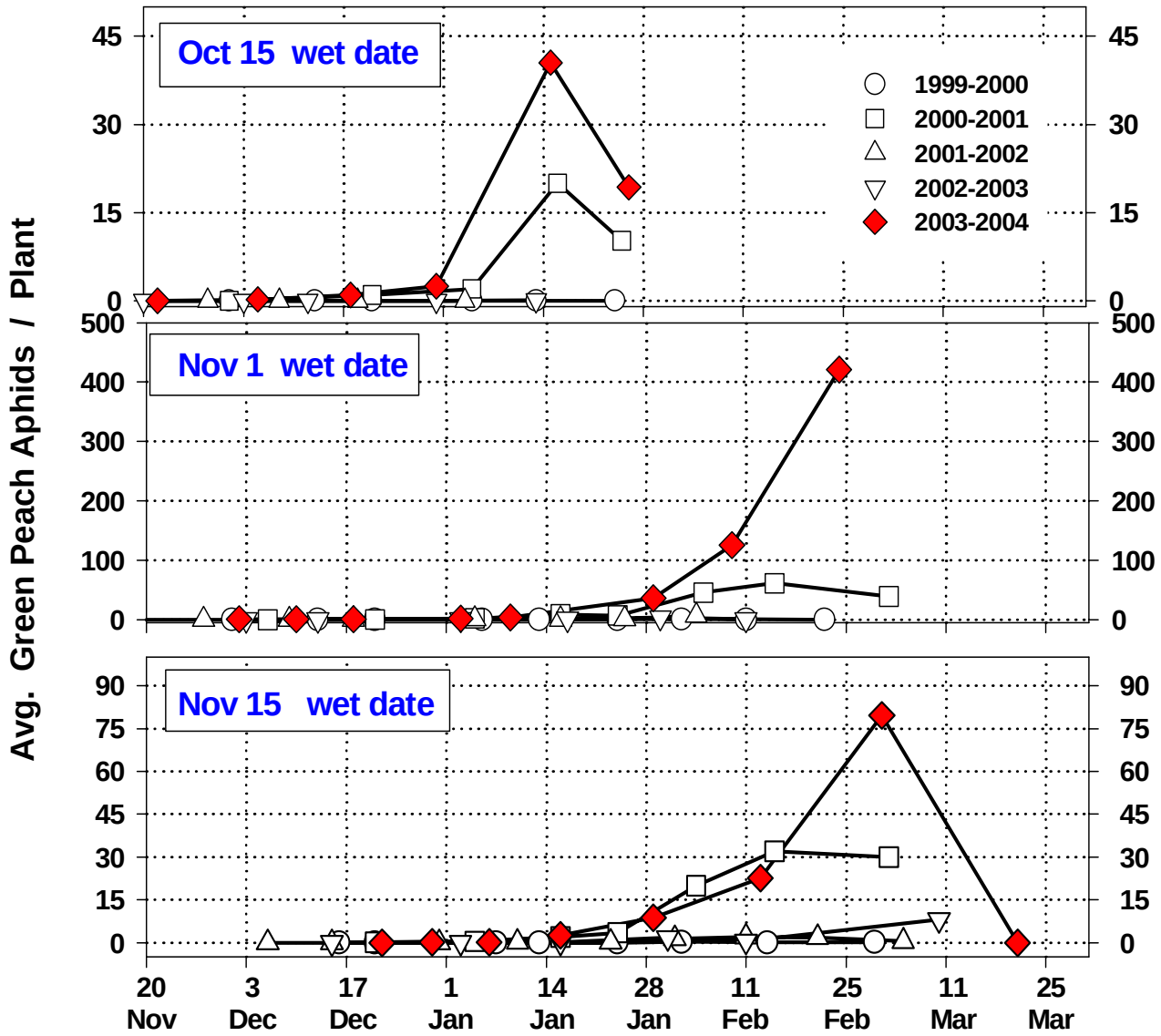
Lettuce aphid
Nasonovia ribis-nigri



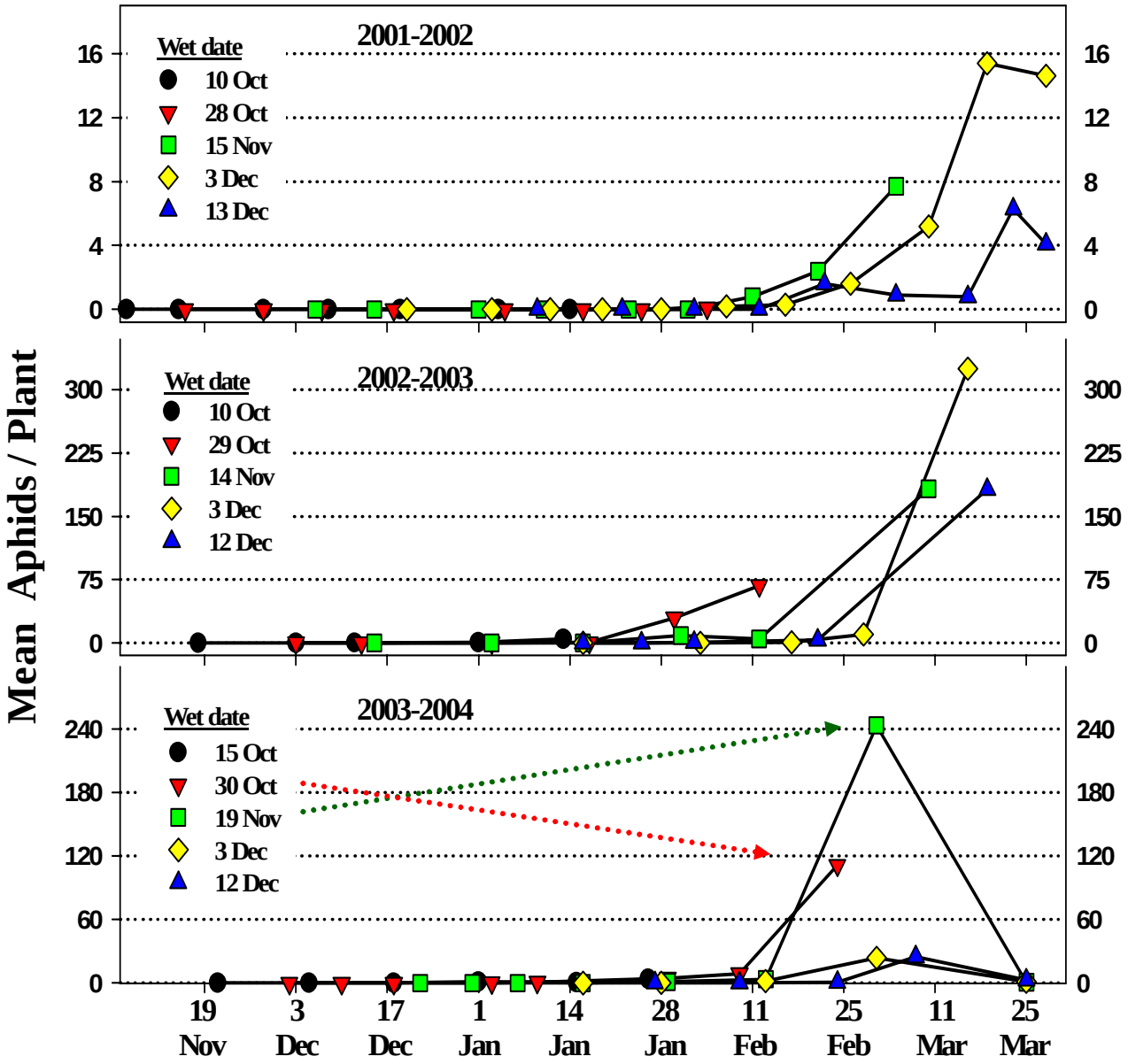
Sticky trap monitoring



Green Peach Aphid



Foxglove Aphid



Seasonal Avg. Green Peach Aphids / Plant

	Wet date					
Season	11 Oct	2 Nov	15 Nov	3 Dec	15 Dec	5 Yr Avg
1999-2000	0.0	0.1	0.1	0.3	0.2	0.1
2000-2001	5.5	20.4	12.6	4.7	5.7	9.8
2001-2002	0.0	1.0	0.7	0.2	0.1	0.4
2002-2003	0.0	0.8	1.8	0.0	0.3	0.6
2003-2004	15.8	117.0	23.0	10.6	12.0	**35.7**
Season Avg	4.3	**27.9**	7.6	3.2	3.7	

Seasonal Avg. Potato Aphids* / Plant

Season	Wet date					5 Yr Avg
	11 Oct	2 Nov	15 Nov	3 Dec	15 Dec	
1999-2000	0.0	0.1	2.5	3.5	1.0	1.8
2000-2001	1.3	6.7	4.6	1.6	2.7	3.4
2001-2002	0.2	0.4	1.5	0.8	5.6	1.7
2002-2003	2.3	1.4	75.2	94.2	60.1	**46.0**
2003-2004	0.0	0.1	0.0	0.0	0.0	0.0
Season Avg	0.8	2.2	16.2	**20.0**	13.9	

*** includes *Acrythosiphum lactucae* populations**

Seasonal Avg. Foxglove Aphids* / Plant

Season	Wet date					5 Yr Avg
	11 Oct	2 Nov	15 Nov	3 Dec	15 Dec	
1999-2000	-	-	-	-	-	-
2000-2001	-	-	-	-	-	-
2001-2002	0.0	0.1	1.2	14.6	1.5	3.5
2002-2003	1.1	16.3	32.6	67.1	37.2	**30.9**
2003-2004	1.4	25.1	49.8	5.6	5.7	17.5
Season Avg	0.8	13.8	**27.9**	**29.1**	14.8	

Seasonal Avg. for *Total Aphid Complex*

Season	Wet date					5 Yr Avg
	11 Oct	2 Nov	15 Nov	3 Dec	15 Dec	
1999-2000	0.0	0.1	1.4	1.7	1.9	1.0
2000-2001	2.3	9.4	6.1	3.1	5.8	5.3
2001-2002	0.1	0.4	1.1	4.1	2.9	1.7
2002-2003	0.9	4.7	27.9	48.5	34.5	**23.3**
2003-2004	4.3	35.6	18.3	4.3	5.6	13.6
Season Avg	1.5	**10.0**	**11.0**	**12.3**	**10.1**	

Winged Aphids

Dark abdominal dorsal markings

Abdominal Dorsal Patch

Dark patch on upper abdomen
Antennae Tubercule Convergent
Cornicles dark and swollen

Green Peach aphid

Abdominal Dorsal Stripes

Tips of cornicles dark

Foxglove aphid

Cornicles dark

Lettuce aphid

No abdominal dorsal markings

Pear shaped with red eyes,
Abdomen appears to have white stripes
Legs and cornicles Light

Acyrthosiphum lactuacae

Body elongate, large, 3-4mm long
Legs segments dark, tips of cornicles dark
Cauda is long

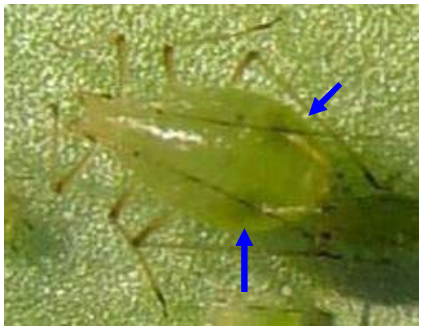
Potato aphid

Wingless Aphids

No abdominal stripes

Green spots near cornicles

Dark patch on upper abdomen
Body shiny, pear shaped
Very mobile



Foxglove aphid

No spots near cornicle

Antennae tuberlces converging inward
Pear shaped, legs and cornicle slight
Lateral dark green stripes along abdoman

Green Peach aphid

Antennae tuberlces diverging out
Body elongate, long cauda and cornicles
Very mobile

Potato aphid

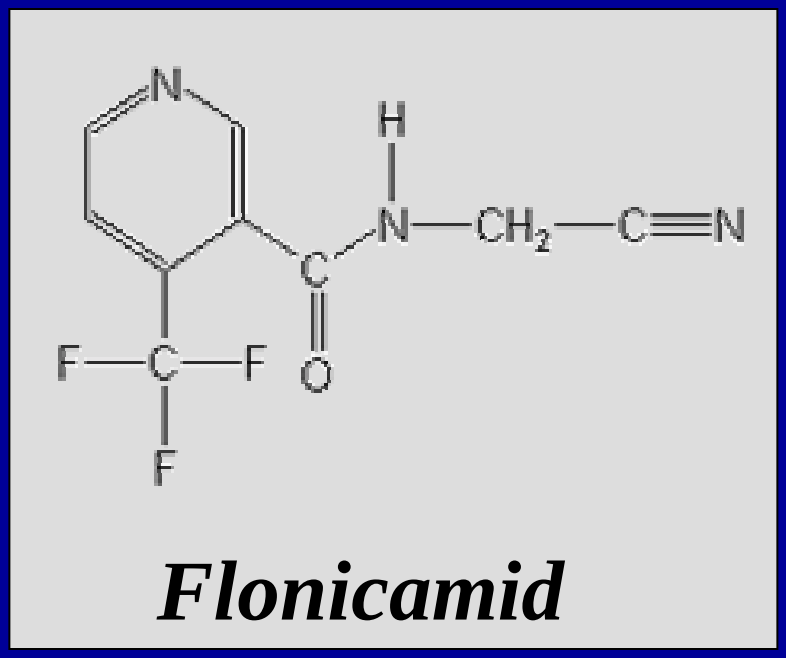
Abdominal stripes or bands

Body dull, waxy bloom
Whitish stripes
Cornicles, antnennae, legs light

Acyrthosiphum lactuacae

Body shiny, tan to red,
Dark abdominal stripes
Tips of cornicles dark
Antennae, legs have dark segments

Lettuce aphid



Flonicamid

Assail®

Pyridinecarboxamide

OP Replacement

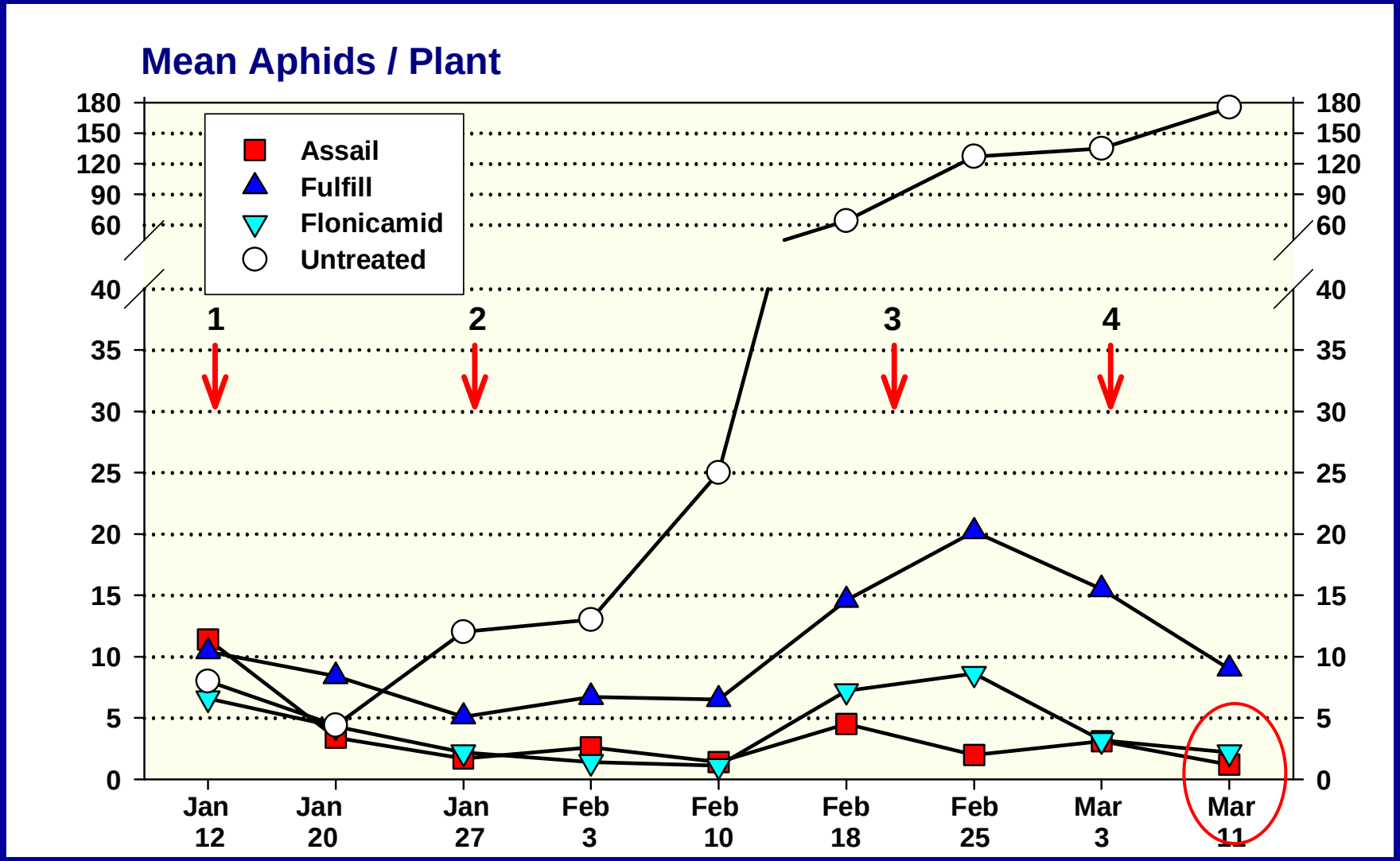
Active primarily on Aphids

Neonicotinoid

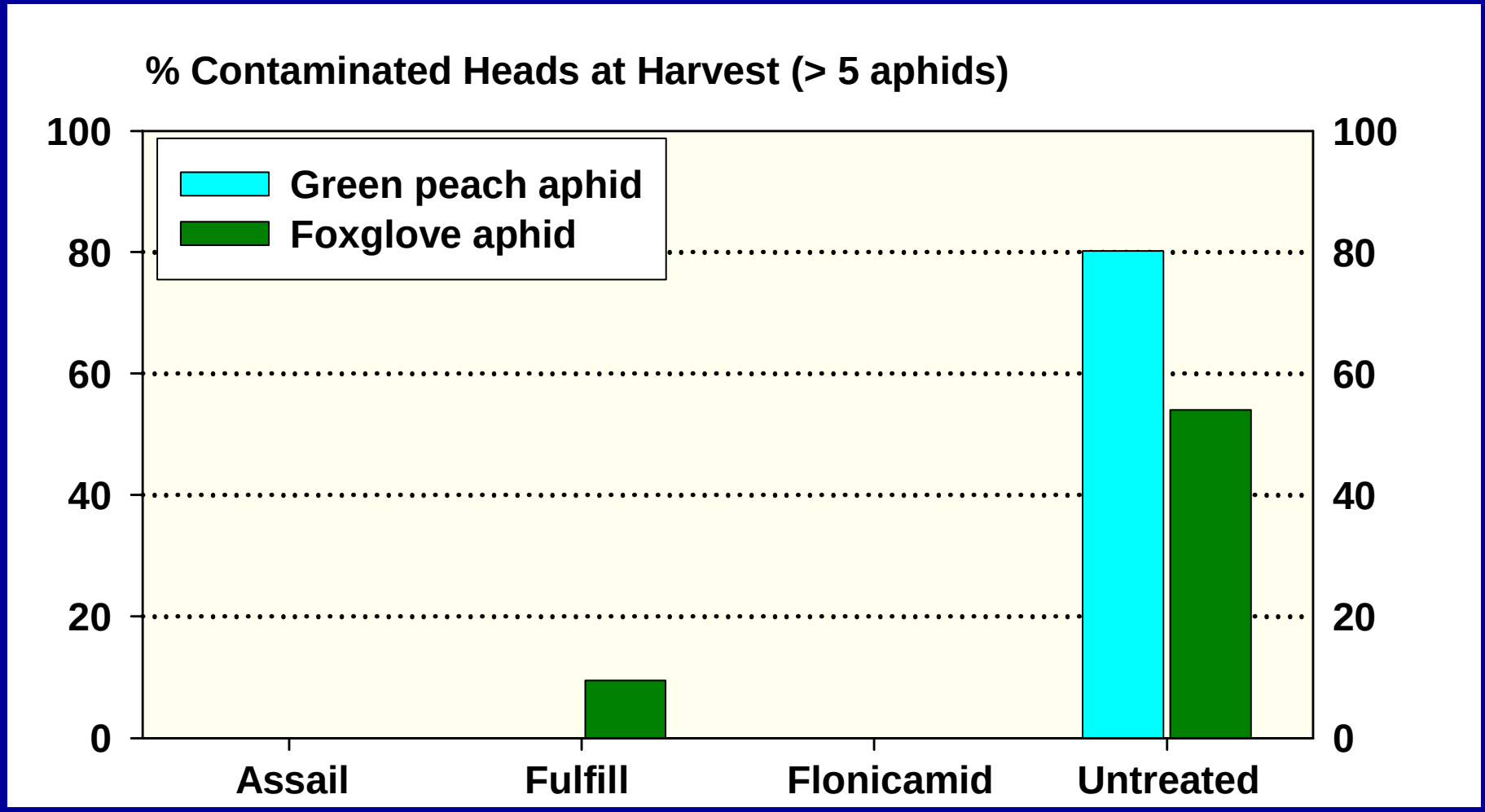
Reduced-risk

Aphid and Whitefly activity

Aphid Control with New Insecticides, Spring 2004



Aphid Control with New Insecticides, Spring 2004



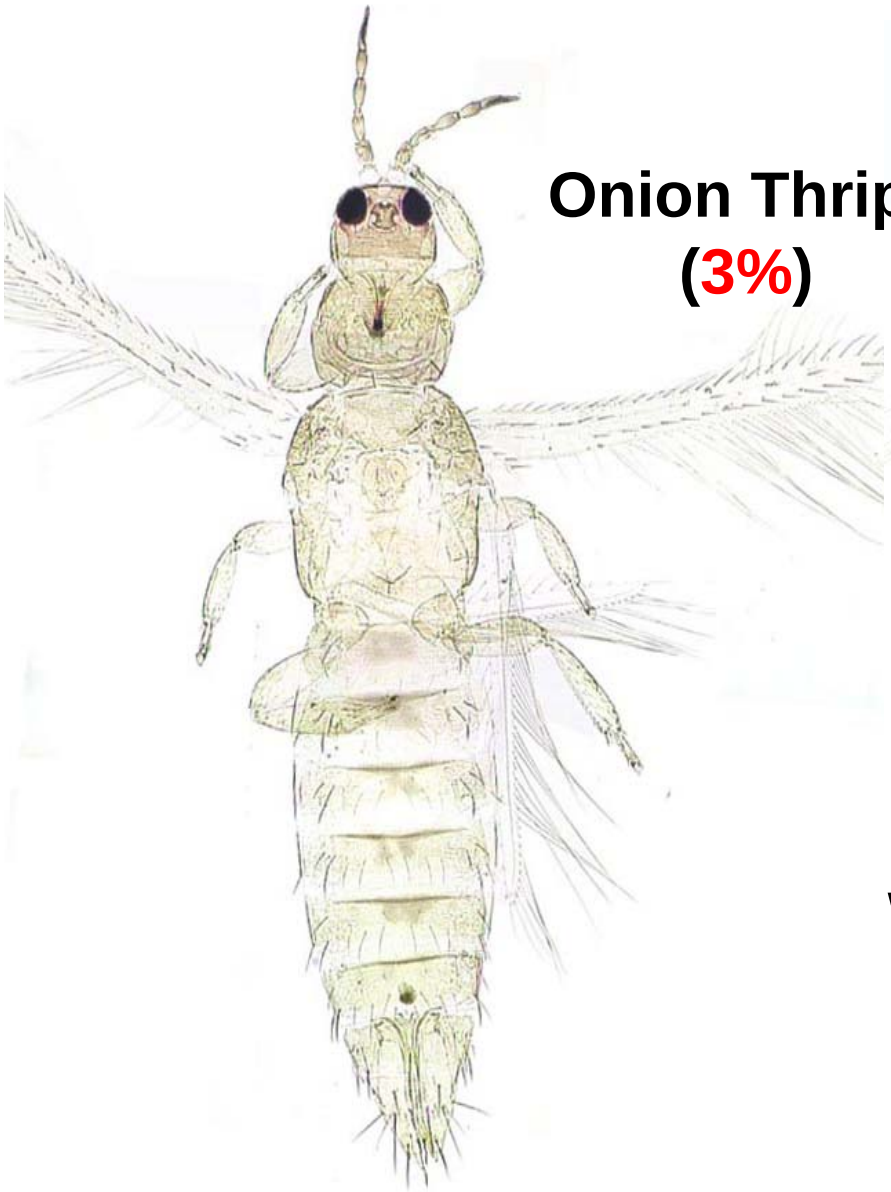
Effective Insecticides for Aphid Management

Admire	Season-long *
Provado	7 day residual
Endosulfan	7-10 d
Dimethoate	7-10 d
Orthene	Head lettuce; 21 d PHI
MSR	Head lettuce; 28 d PHI
Fulfill	7-14 d
Assail (CA)	14 d

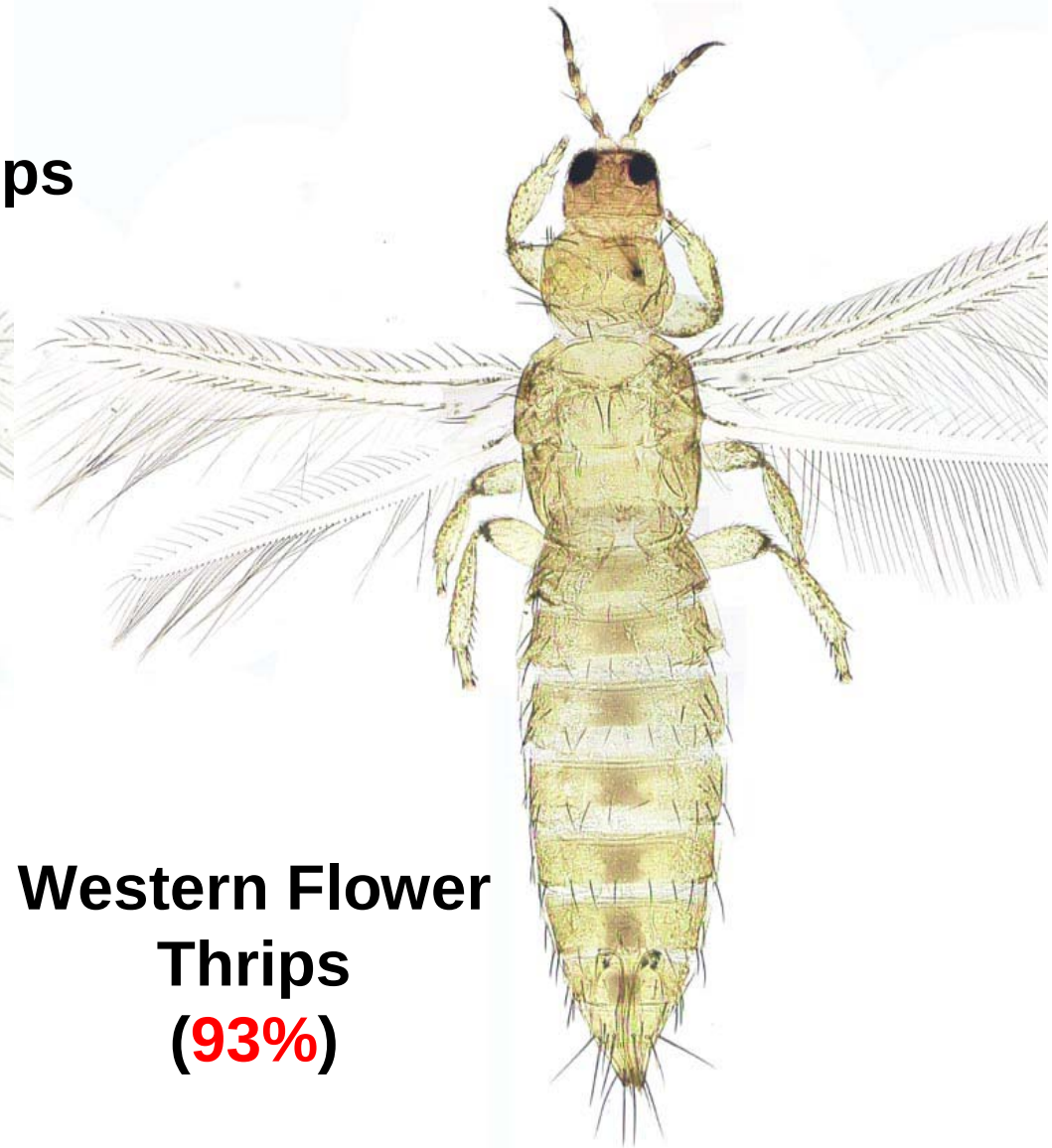
* Higher rates in late Nov-Dec plantings for foxglove aphid

Keys to Economic Aphid Management

- Early detection of colonization
- Proper ID of species
- Treat when populations begin to colonize plants (1- 5% infestation)
- Use Insecticides at effective rates

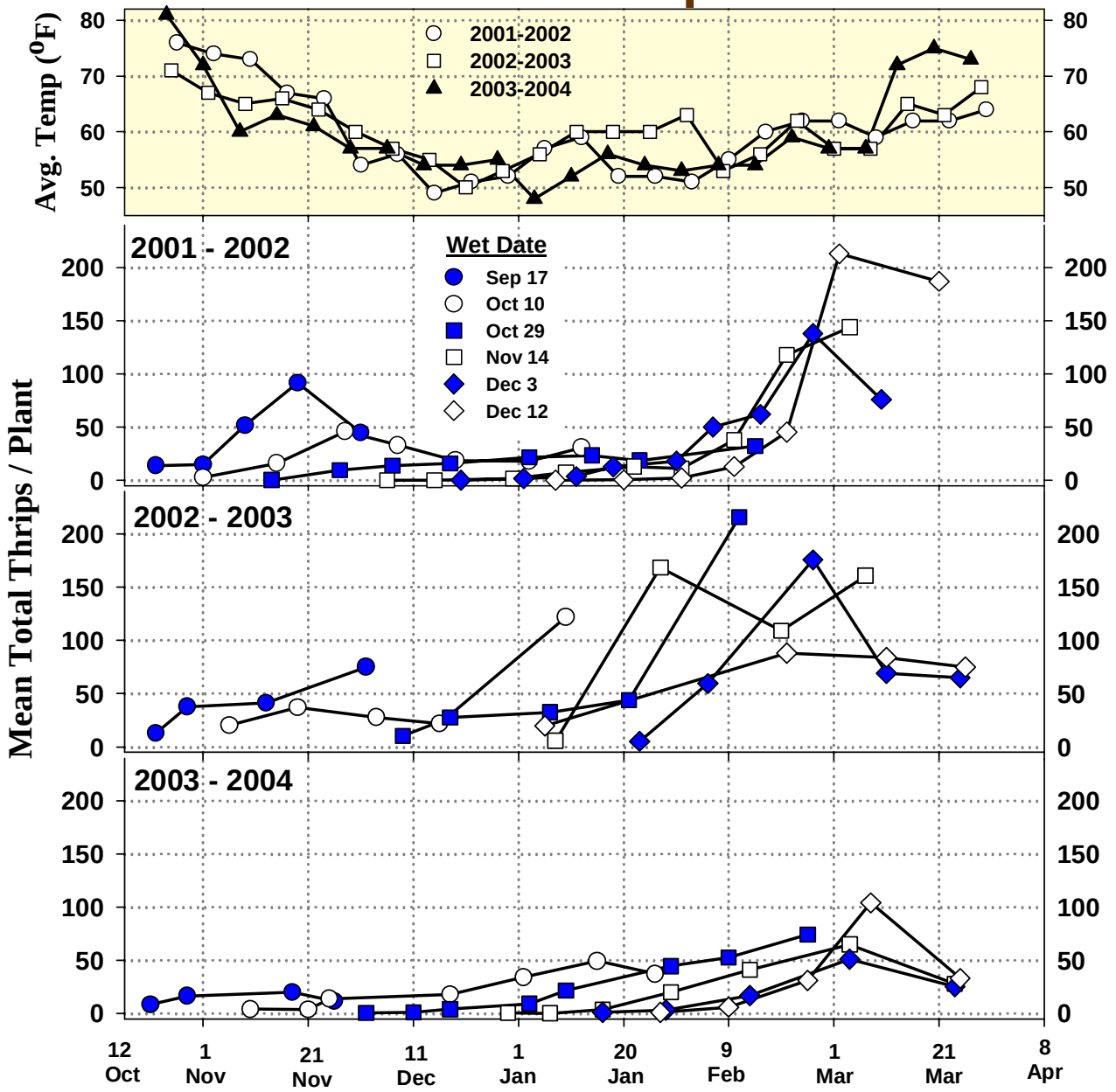


Onion Thrips
(3%)



Western Flower Thrips
(93%)

Western Flower Thrips



Seasonal Avg. Thrips / Plant

Season	Wet date						5 Yr Avg
	17 Sep	10 Oct	30 Oct	15 Nov	2 Dec	15 Dec	
2001-2002	43.3	23.6	16.9	37.0	40.2	65.9	37.8
2002-2003	41.7	45.7	66.2	111.8	75.9	66.8	**68.0**
2003-2004	14.1	22.8	25.9	22.7	19.5	35.0	23.3
Season Avg	33.0	30.7	36.3	**57.2**	**45.2**	**56.0**	

Western Flower Thrips

- No reliable sampling plan
- Lack of quantitative data on damage / quality
- Control is reliant on a few AI:
  - Lannate
  - Success
  - Orthene
- Insecticide resistance is a concern
- Lack of New alternatives
  - ~ *Flonicamid / Assail*

Western Flower Thrips in Organic Lettuce

Dow AgroSciences

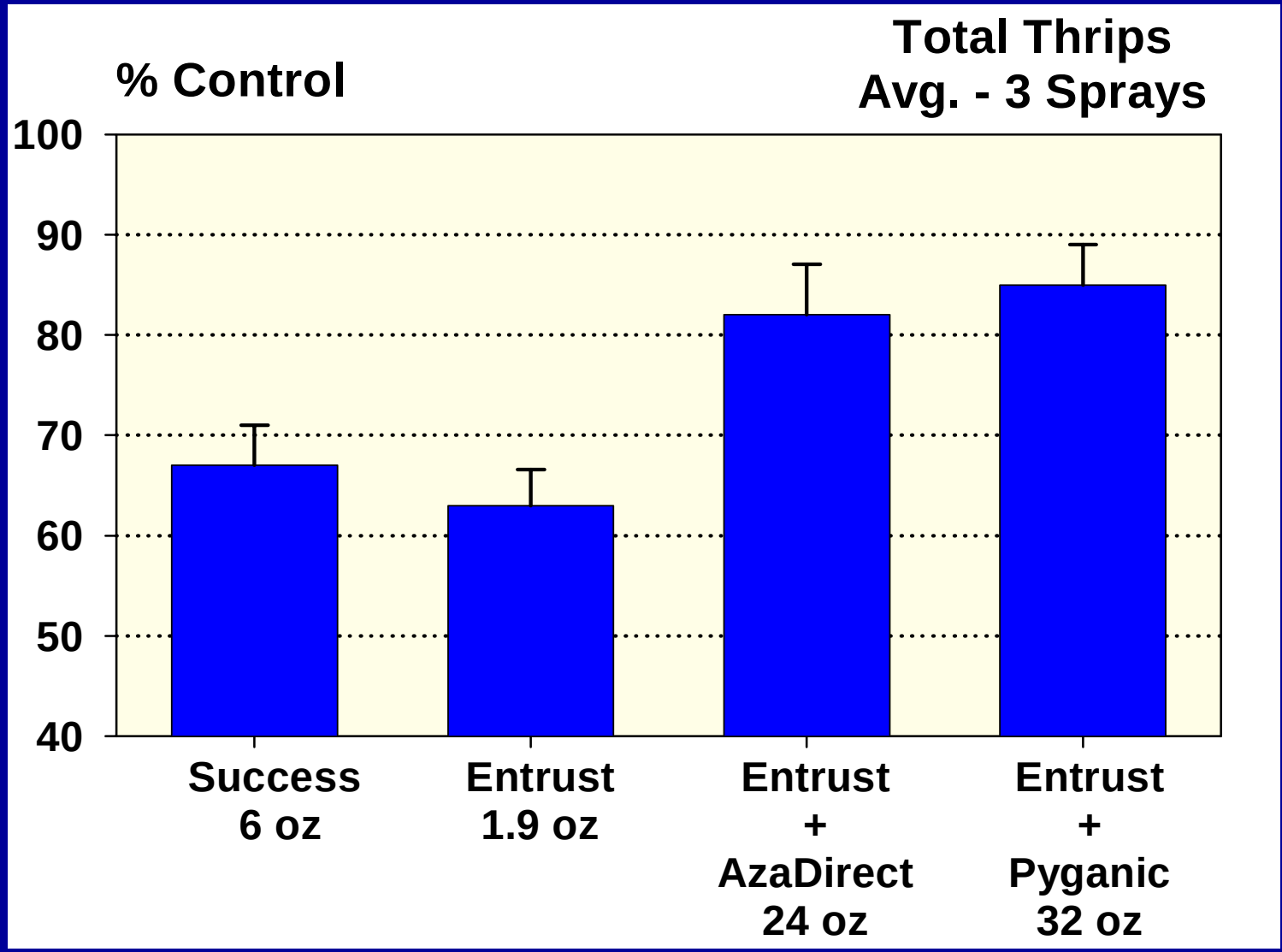
Entrust*

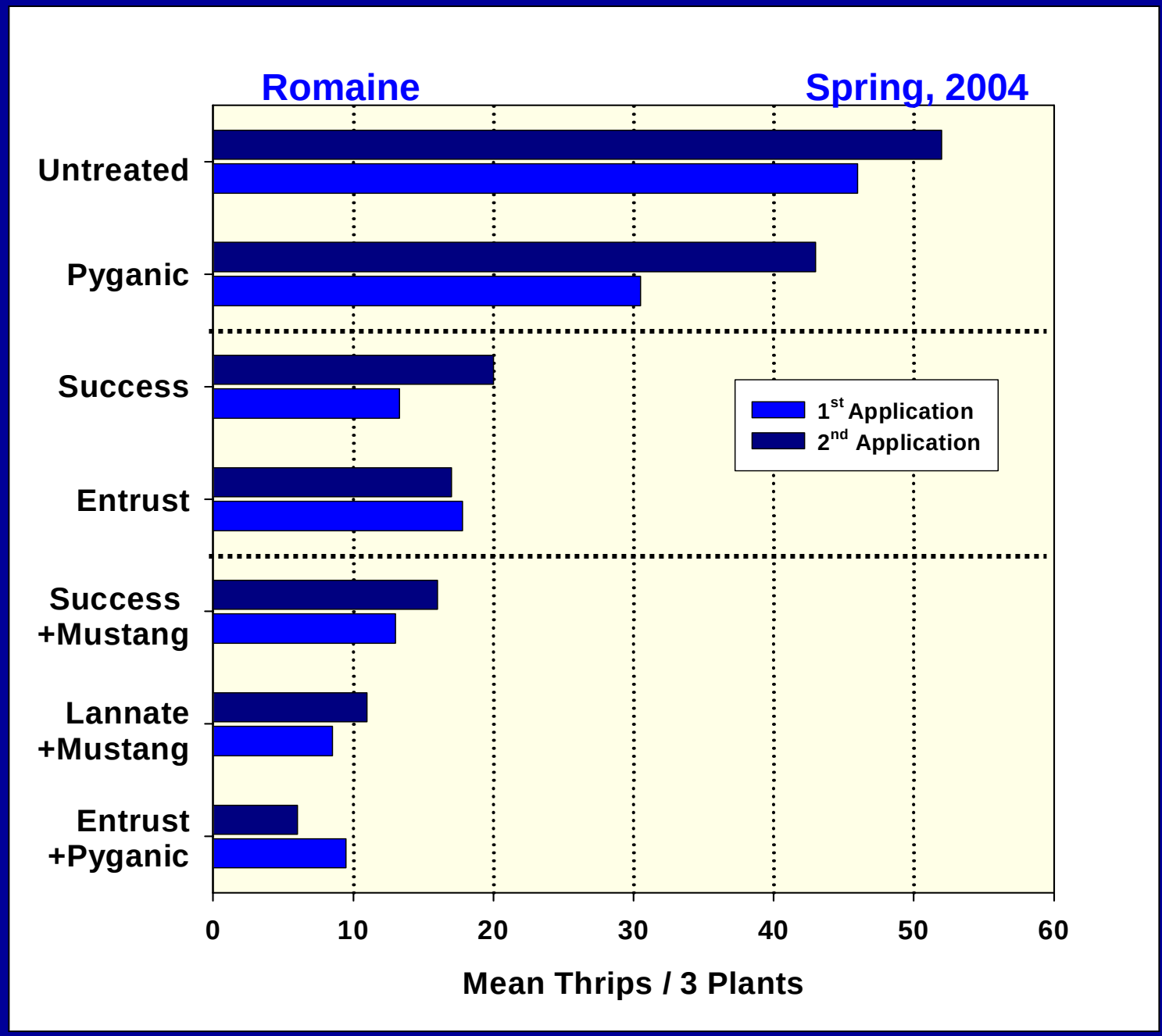
Naturalyte* Insect Control

*Trademark of Dow AgroSciences LLC

Western Flower Thrips Control with Entrust

Fall 2003




Romaine
Spring, 2004
Untreated
Pyganic
Success
Entrust
Success +Mustang
Lannate +Mustang
Entrust +Pyganic
1st Application
2nd Application
0
10
20
30
40
50
60
Mean Thrips / 3 Plants

Key to Economic Thrips Management

- Early detection of thrips populations

  "A few probably means a lot"

- Treat before thrips larvae become established

- Use Insecticides at effective rates

- By ground when possible


AG-IS
www.ag.arizona.edu/crops