RESPONSE OF TWO POPULATIONS OF SILVERLEAF WHITEFLY TO SIX SELECT INSECICIDES AND MANAGEMENT OF TYLCV AND GRSV

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ACKNOWLEDGEMENT

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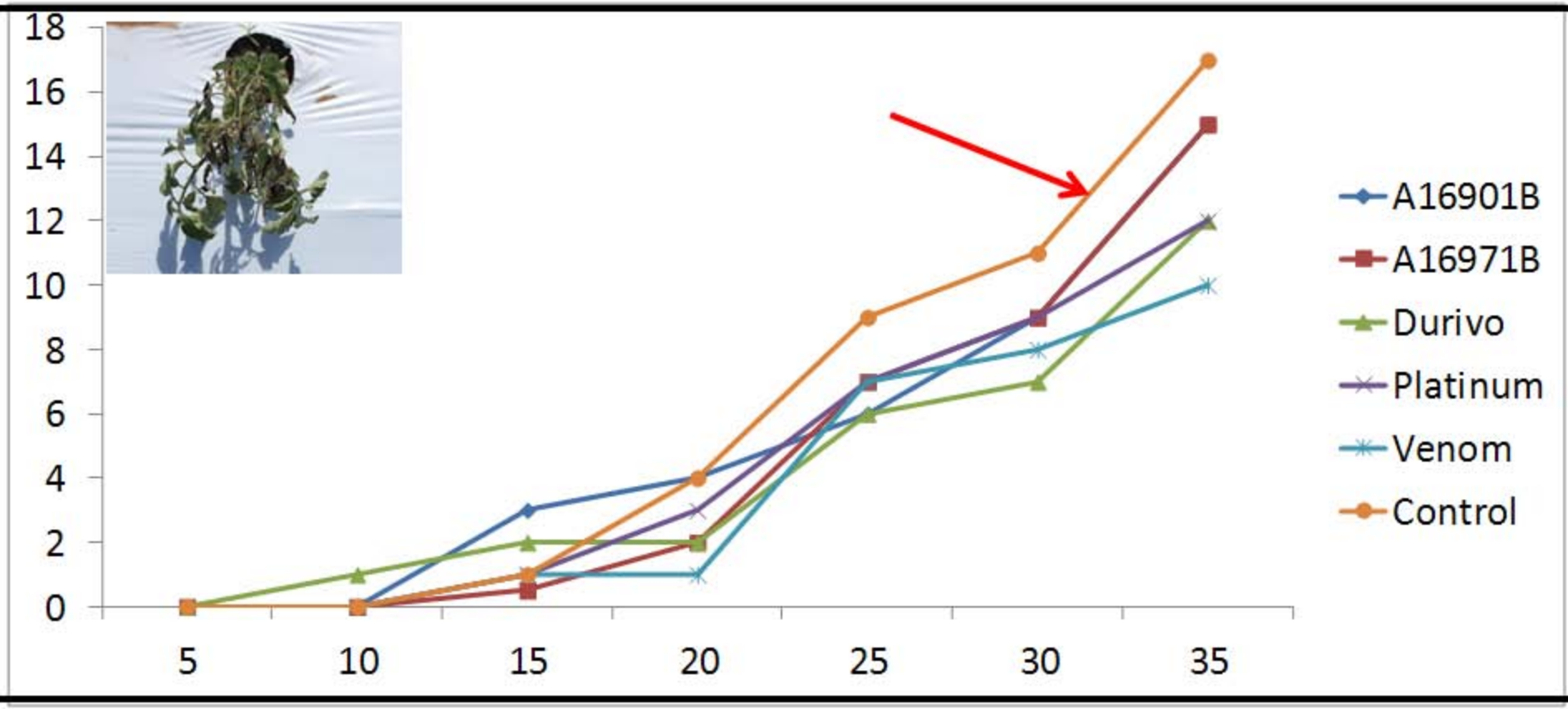
- Lab Assistants:

Cathie Sabines, Cliff Martin, Charlie Carter and Jacinto Betancourt

DISCLAIMER

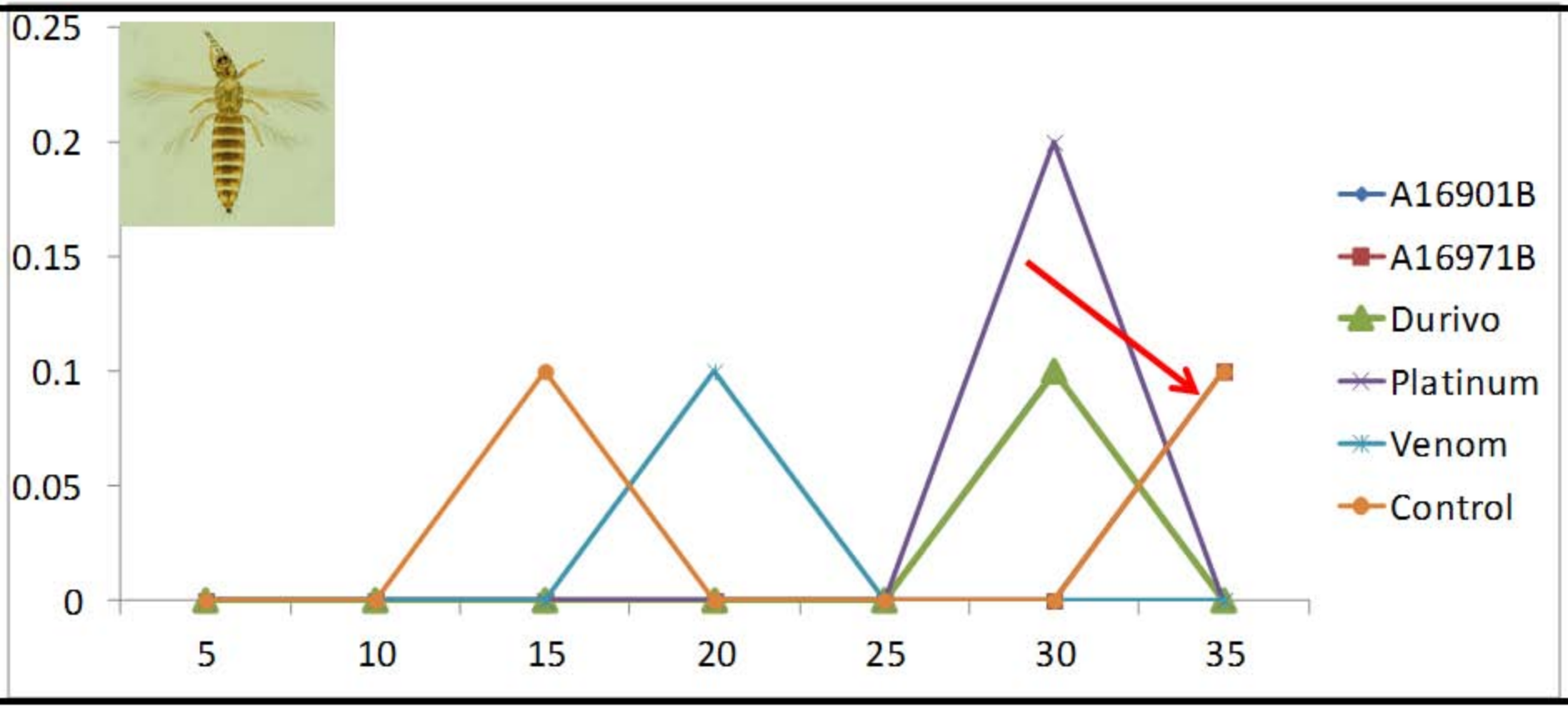
- **Read and follow all label instructions. This includes directions for use, precautionary statements (hazards to humans, domestic animals, and endangered species), environmental hazards, rates of application, number of applications, reentry intervals, harvest restrictions, storage and disposal, and any specific warnings and/or precautions for safe handling of the pesticide.**

Management of GRSV applying premixed insecticides, TREC, 2012



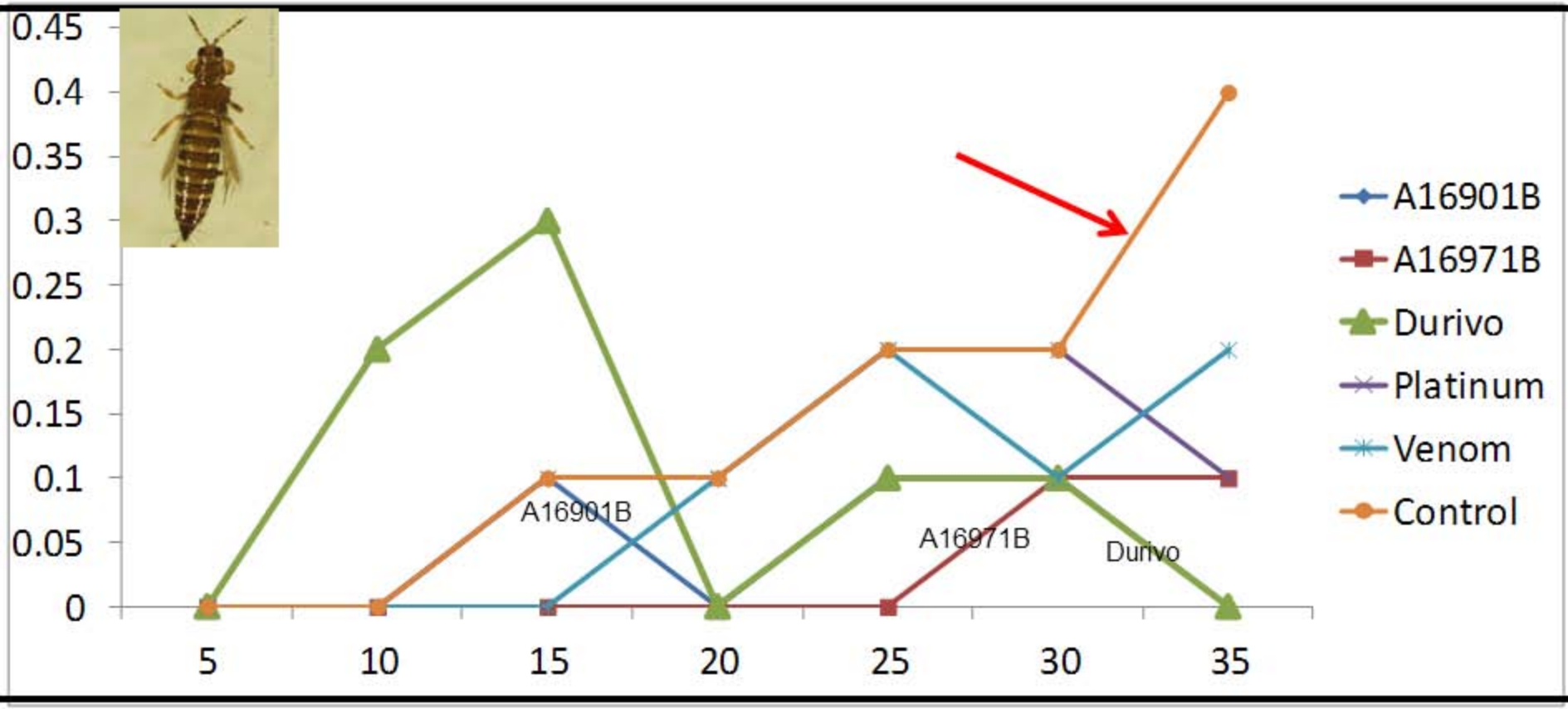
Durivo, Venom, and Platinum did not significantly reduce GRSV affected plants when compared with the nontreated control

Mean numbers of *F. occidentalis*/ tomato leaf sample treated with premixed insecticides



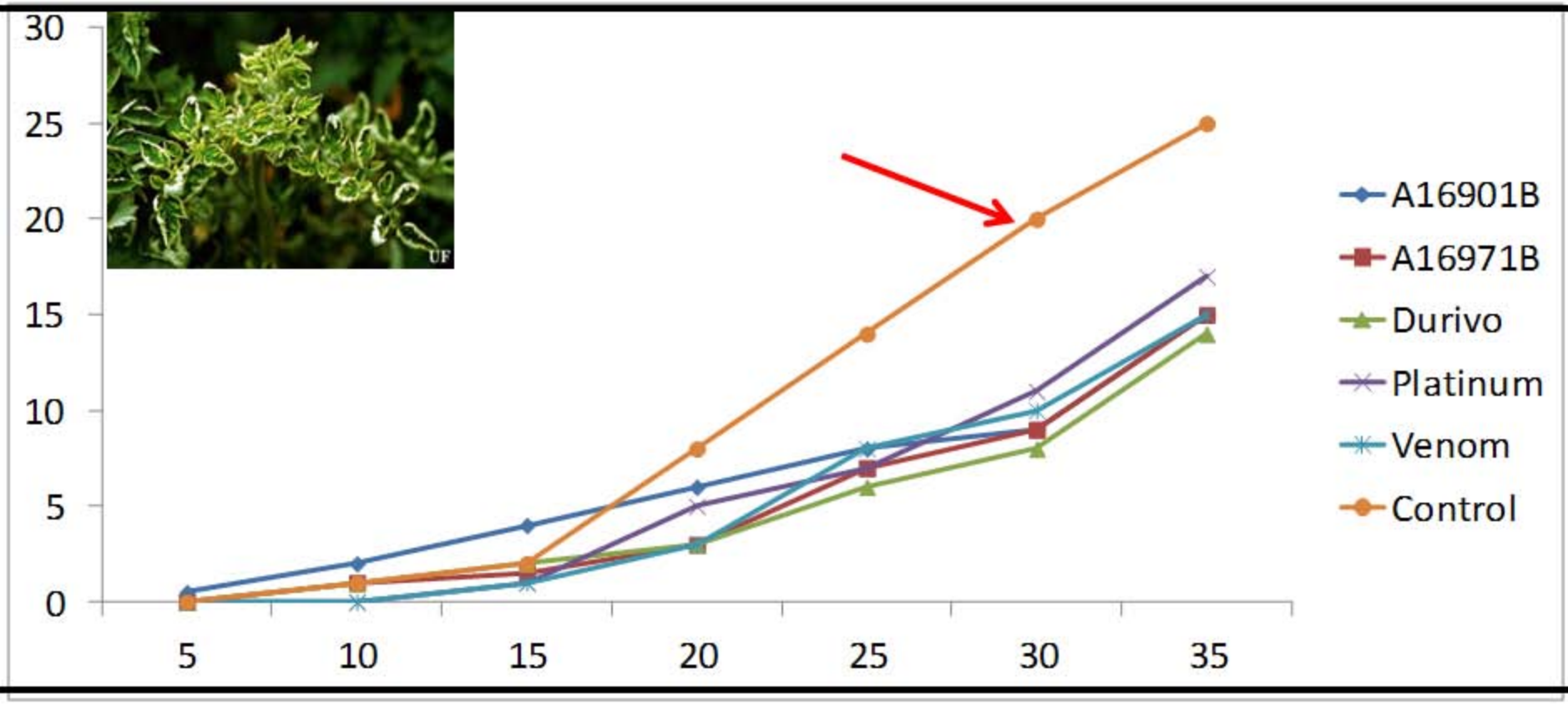
Insecticide treatments did not significantly reduced *F. occidentalis* populations on tomato When compared with the nontreated control.

Management of *F. schultzei* applying premixed products, TREC, 2012



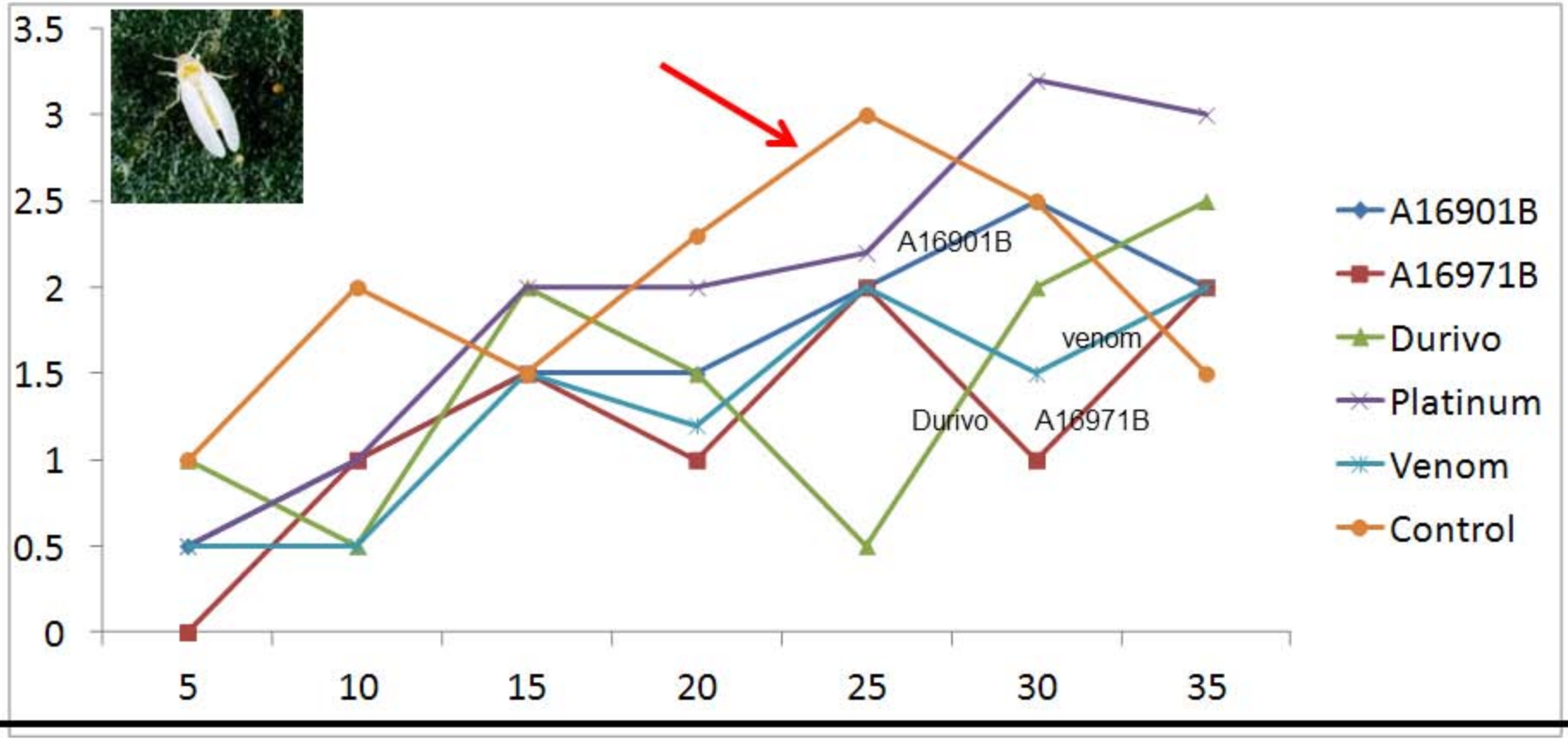
Insecticide treatments did not significantly reduced *F. schultzei* populations on Tomato when compared with the nontreated control.

Management of TYLCV applying premixed products, TREC, 2012



All insecticide treatments significantly reduced TYLCV infected plants when compared with the nontreated control.

Control of silverleaf whitefly in tomato applying premixed products, TREC, 2012

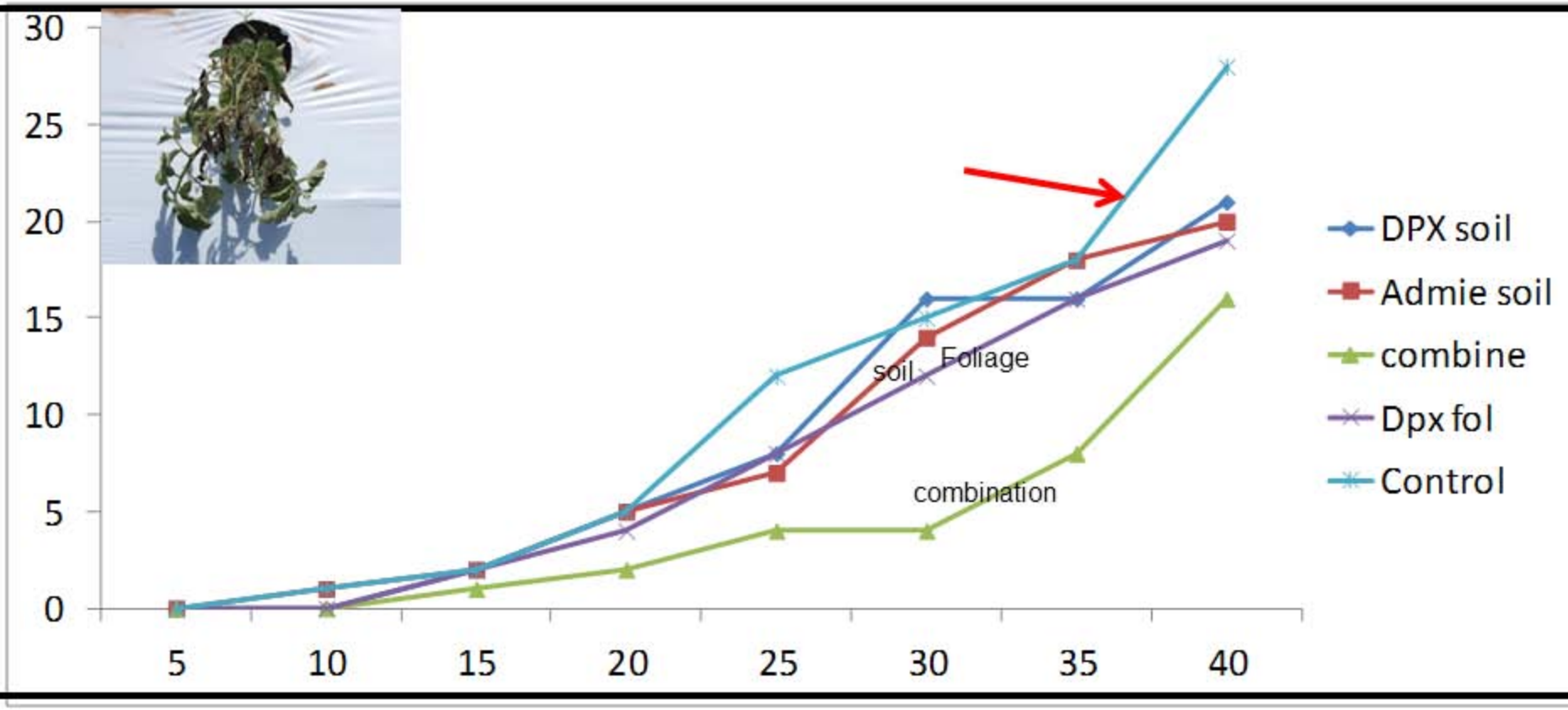


Durivo, Venom and A16971B significantly reduced SLW adults when compared with the nontreated control

Evaluation of premixed products in controlling pests of tomato: all treatments were applied at plant as a soil drench

Treatments	Rate/acre	Active ingredients
A16901 WG	131.0 oz wt	Thiamethoxam + an experimental product
A16971 WG	65.4 oz wt	An experimenal product
Durivo SC	123.0 fl oz	Thiamethoxam + chlorantraniliprole
Platinum SG	34.2 oz wt	Thiamethoxam
Venom SG	6.0 oz wt	Dinotefuran
Check		

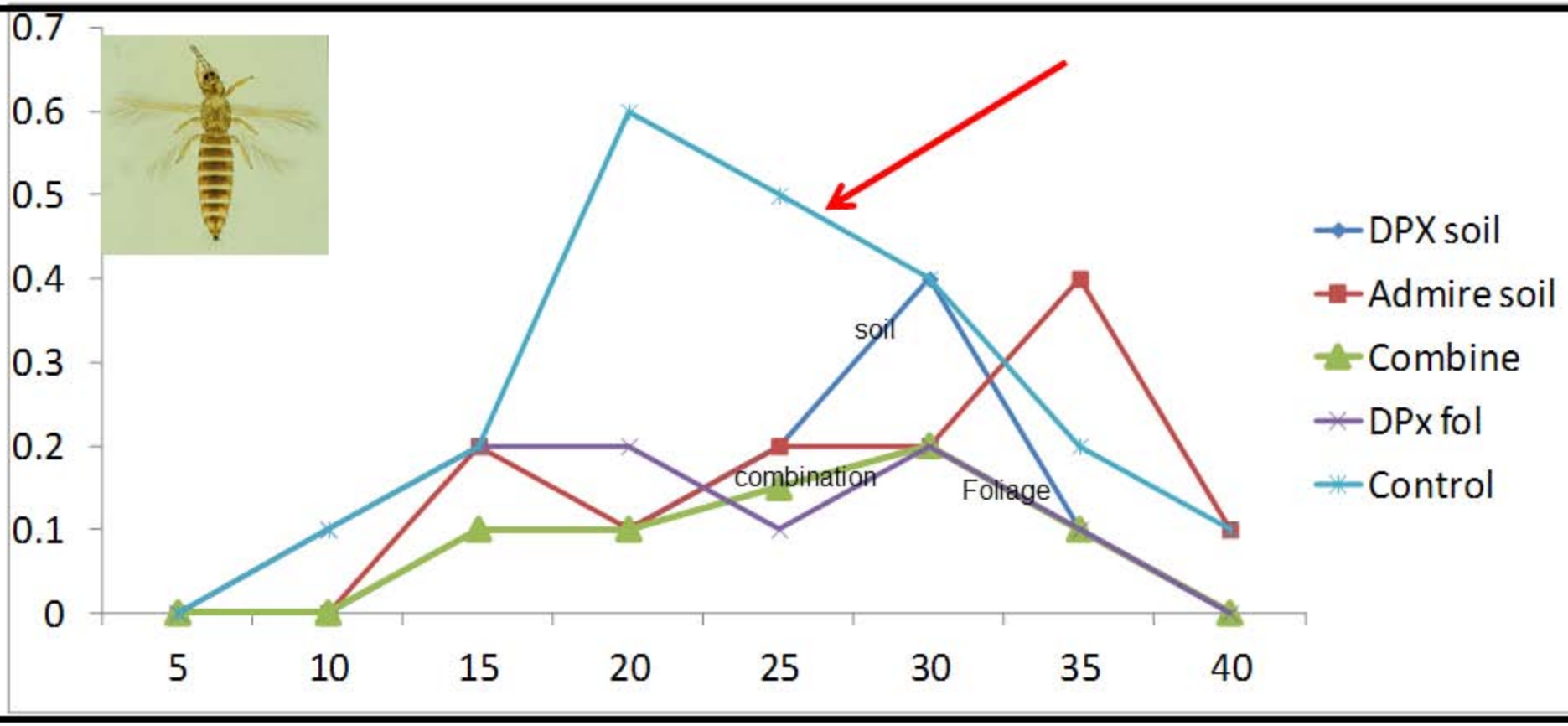
Control of GSRV in tomatoes using DPX and Admire Pro as a soil drench



DPX applied on foliage did not differ from DPX applied in soil in reducing GRSV

Admire at soil followed be DPX on foliage was significantly better than all other treatments in reducing GRSV incidence.

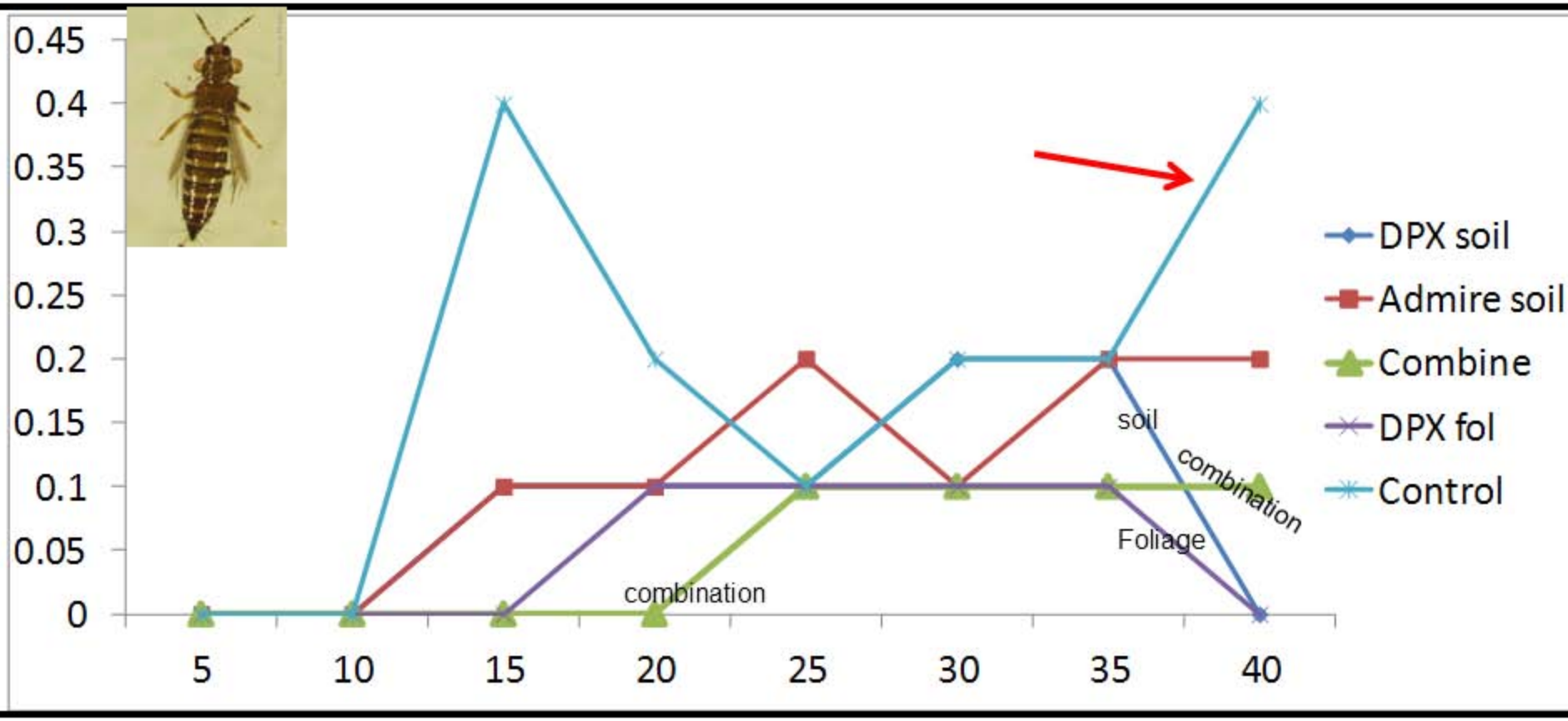
Control of *F. occidentalis* in tomatoes using DPX and Admire Pro as a soil drench



DPX applied on foliage provided better reduction of *F. schultzei* than other treatments, but did not differ from the combination treatment

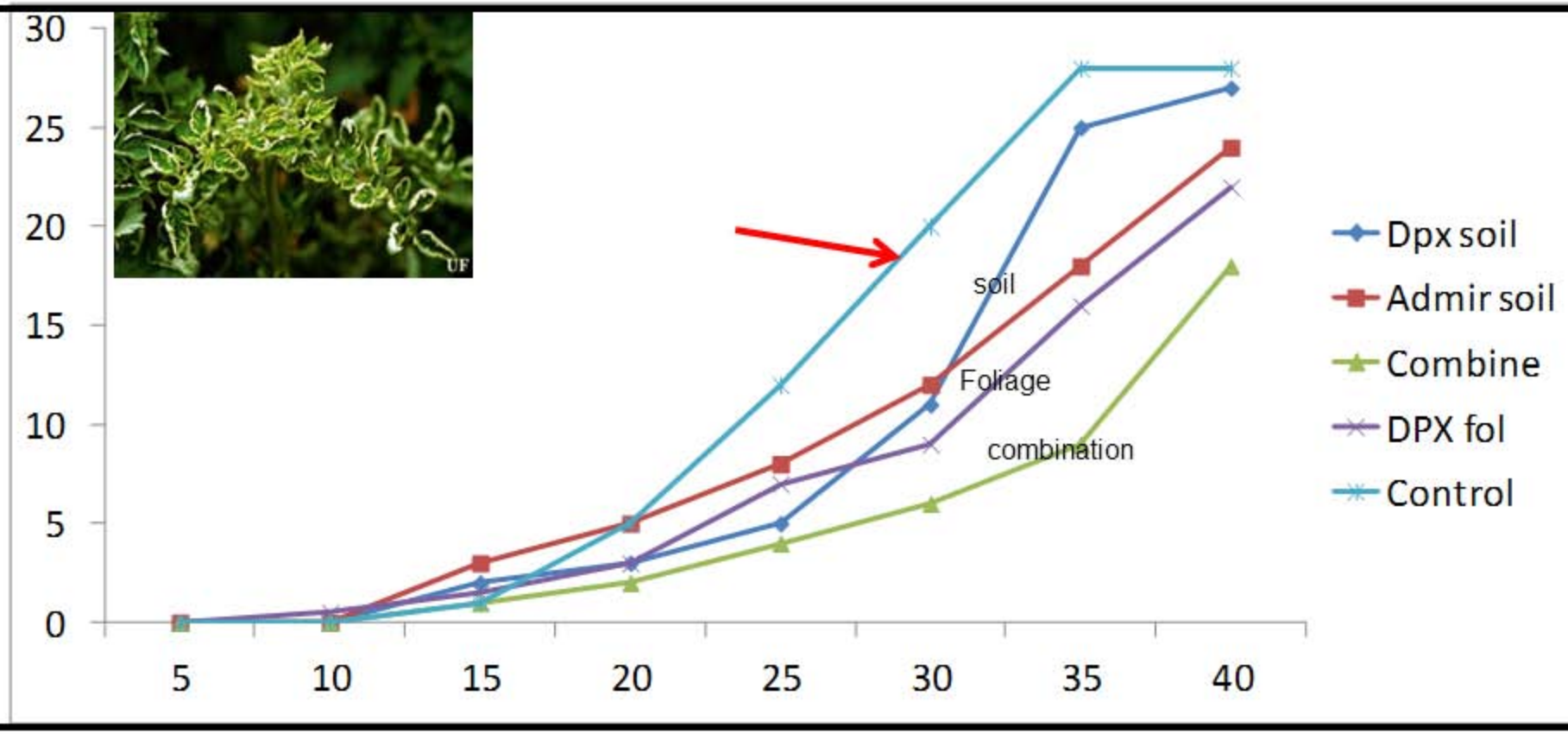
***F. Schultzei* was not recorded on the DPX treatments for the first 10 d**

Control of *F. schultzei* in tomatoes using DPX and Admire Pro as a soil drench



DPX applied on foliage provided better reduction of *F. schultzei* than other treatments
***F. Schultzei* was not recorded on the combination treatment for the first 20 d**

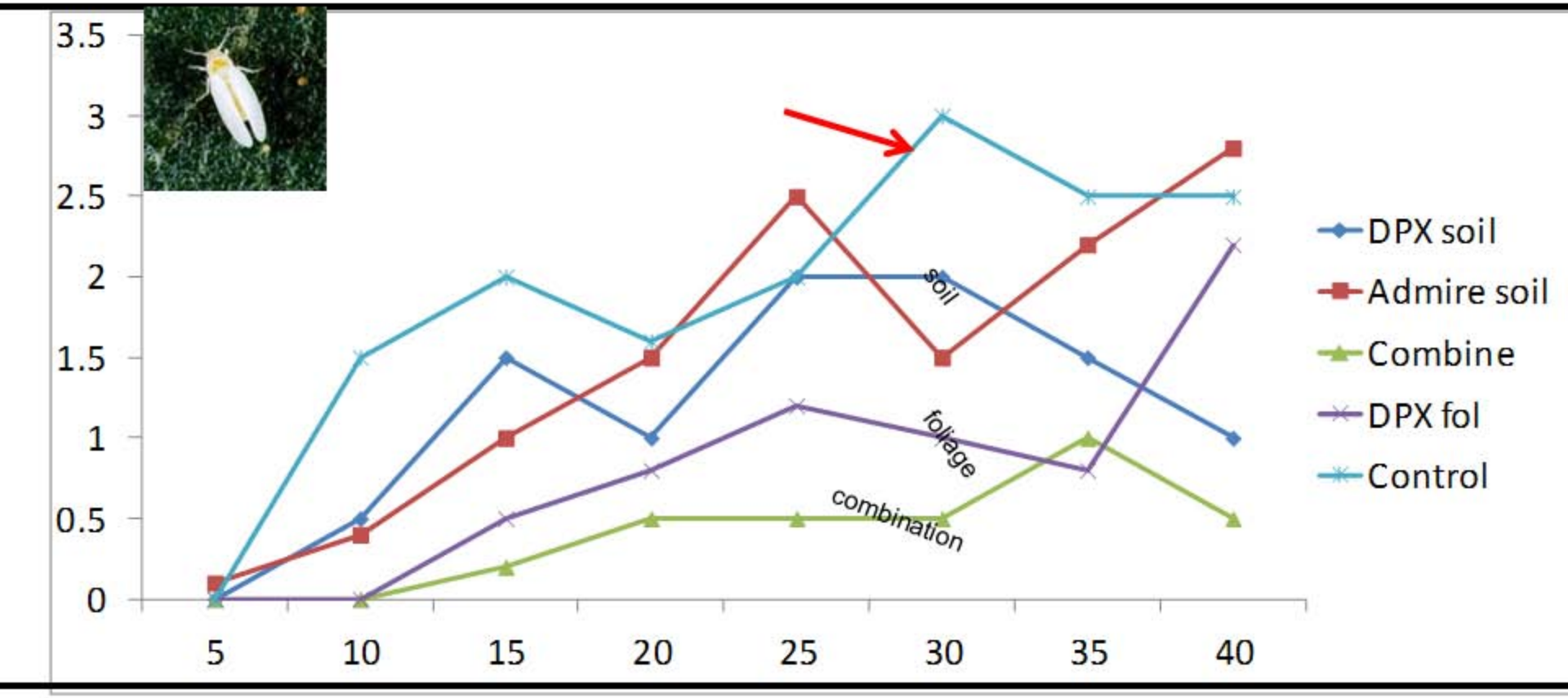
Control of TYLCV using DPX and Admire Pro as a soil drench



DPX applied on foliage provided better reduction of TYLCV than DPX applied in Soil

Admire at soil followed by DPX on foliage was better than all other treatments in reducing TYLCV incidence

Control of SLW adults in tomatoes using DPX and Admire Pro as a soil drench

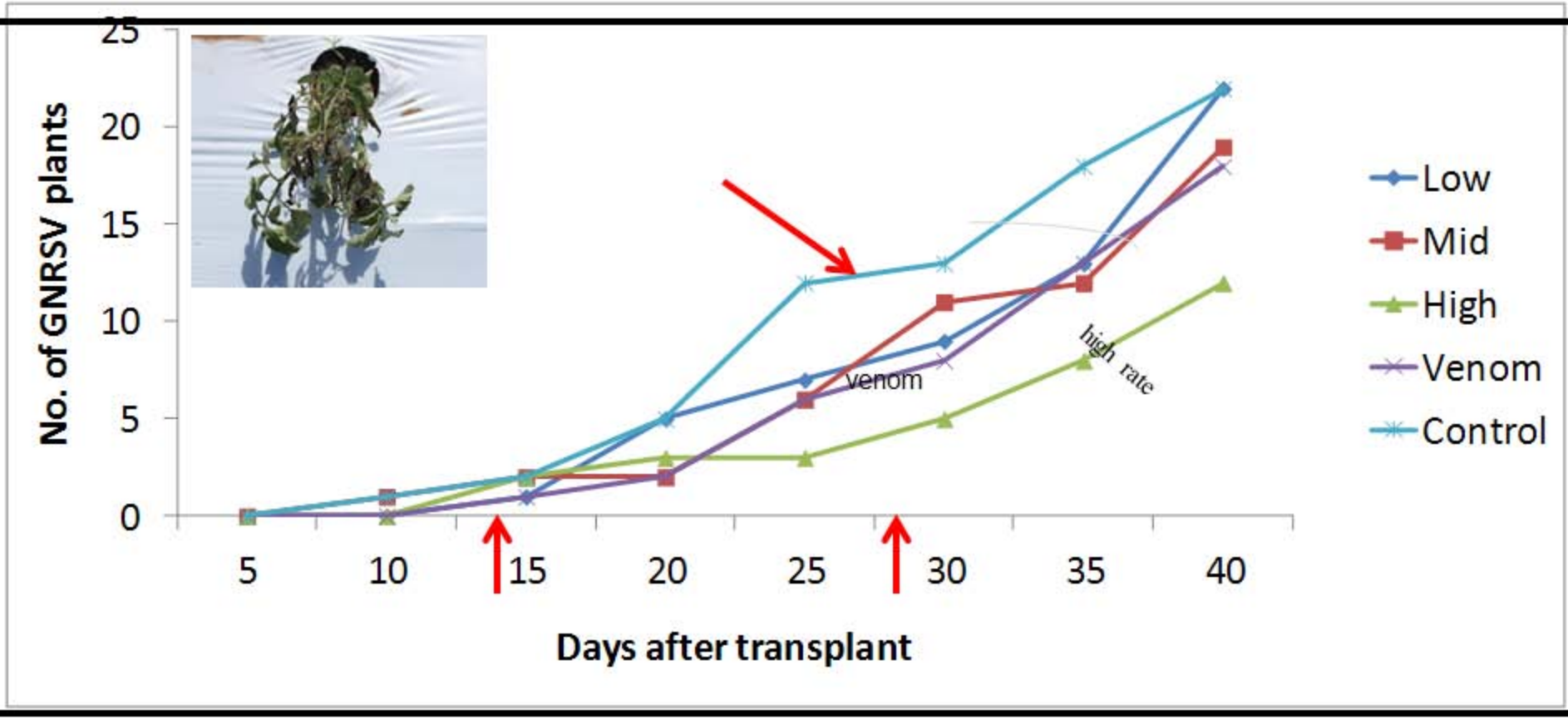


DPX applied on foliage provided better reduction of SLW than DPX applied in soil
Admire at soil followed be DPX on foliage was better than all other treatments followed by DPX on foliage

Control of silverleaf whitefly, Flower thrips and Common blossom thrips in tomato by applying DPX-HGW86 20SC as a soil drench

Treatments	Rate [oz]/A	Method of application
1. DPX-HGW86 20SC	13.5	At plant
2. Admire Pro	10.5	At plant
DPX-HGW86 20SC	10.3	Drip at 14 & 28 DAP
3. Admire Pro	10.5	At plant
4. DPX-HGW86 20SC	10.3	On foliage
5. Untreated check		

Management of GRSV applying Admire (soil drench) and Cyazypyr (foliar) in a program , TREC, 2012

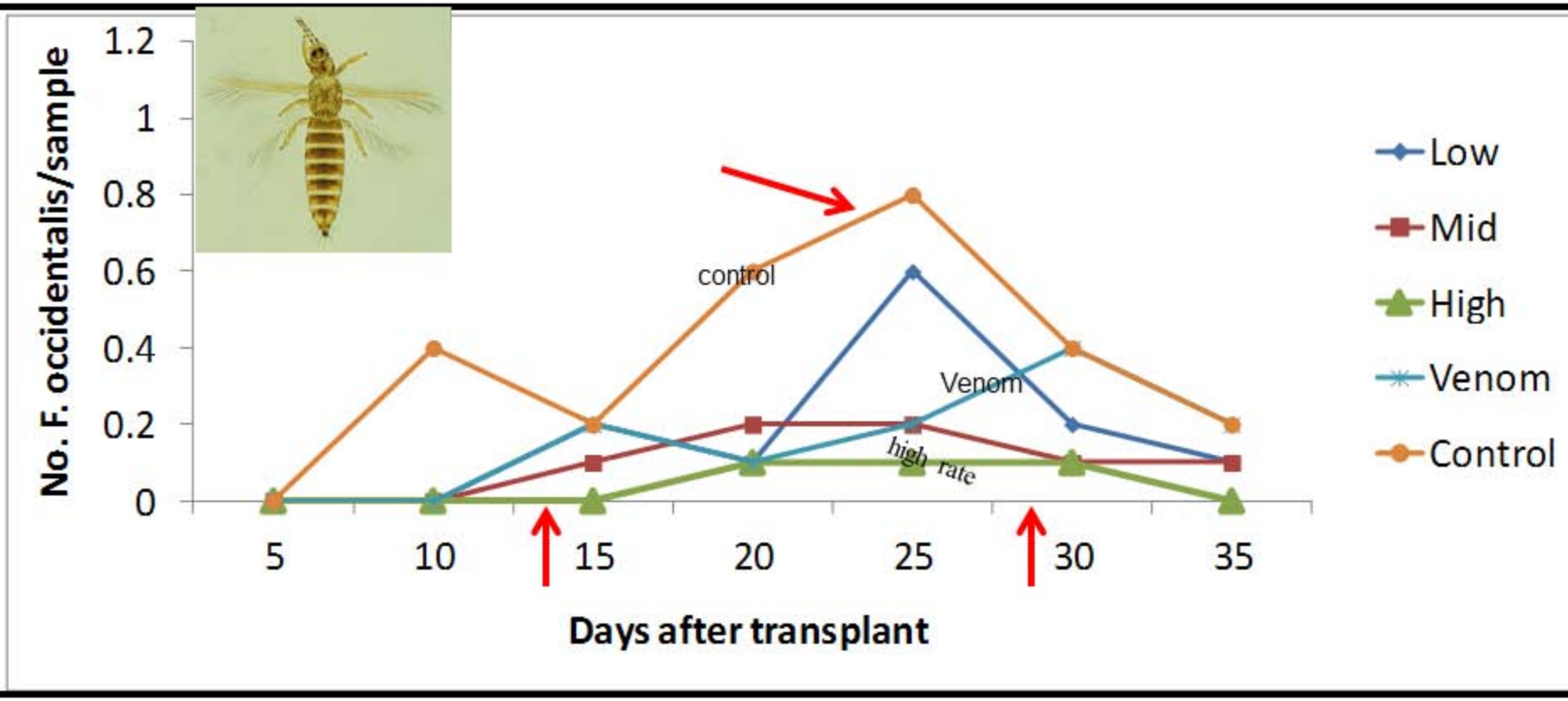


Cyazypyr: low rate (13.46 fl oz.), mid rate (16.82 fl oz), high rate (20.5 fl oz)

All insecticide treatments significantly reduced GSRV incidence when compared with the nontreated control

Cyazypyr at 20.5 oz/acre provided better reduction of GSRV incidence than the other treatments

Control of *F. occidentalis*/plants in tomato applying Admire (soil drench) and Cyazypyr (foliar) in a program , TREC, 2012

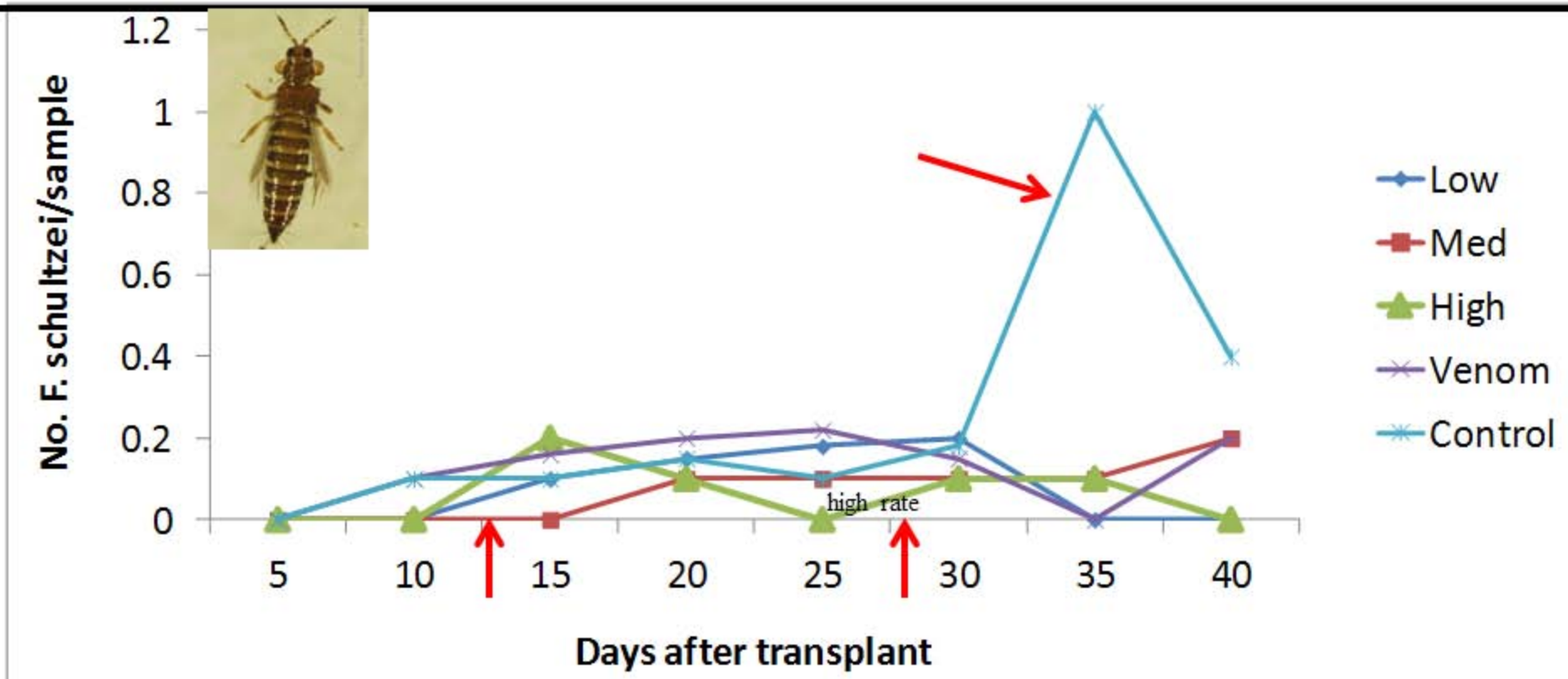


Cyazypyr: low rate (13.46 fl oz.), mid rate (16.82 fl oz), high rate (20.5 fl oz)

All insecticide treatments significantly reduced *F. Occidentalis* populations when compared with the nontreated control

Cyazypyr at 20.5 oz/acre provided better reduction of *F. occidentalis* than the other treatments

Control of *F. schultzei* in tomato applying Admire (soil drench) and Cyazypyr (foliar) in a program , TREC, 2012

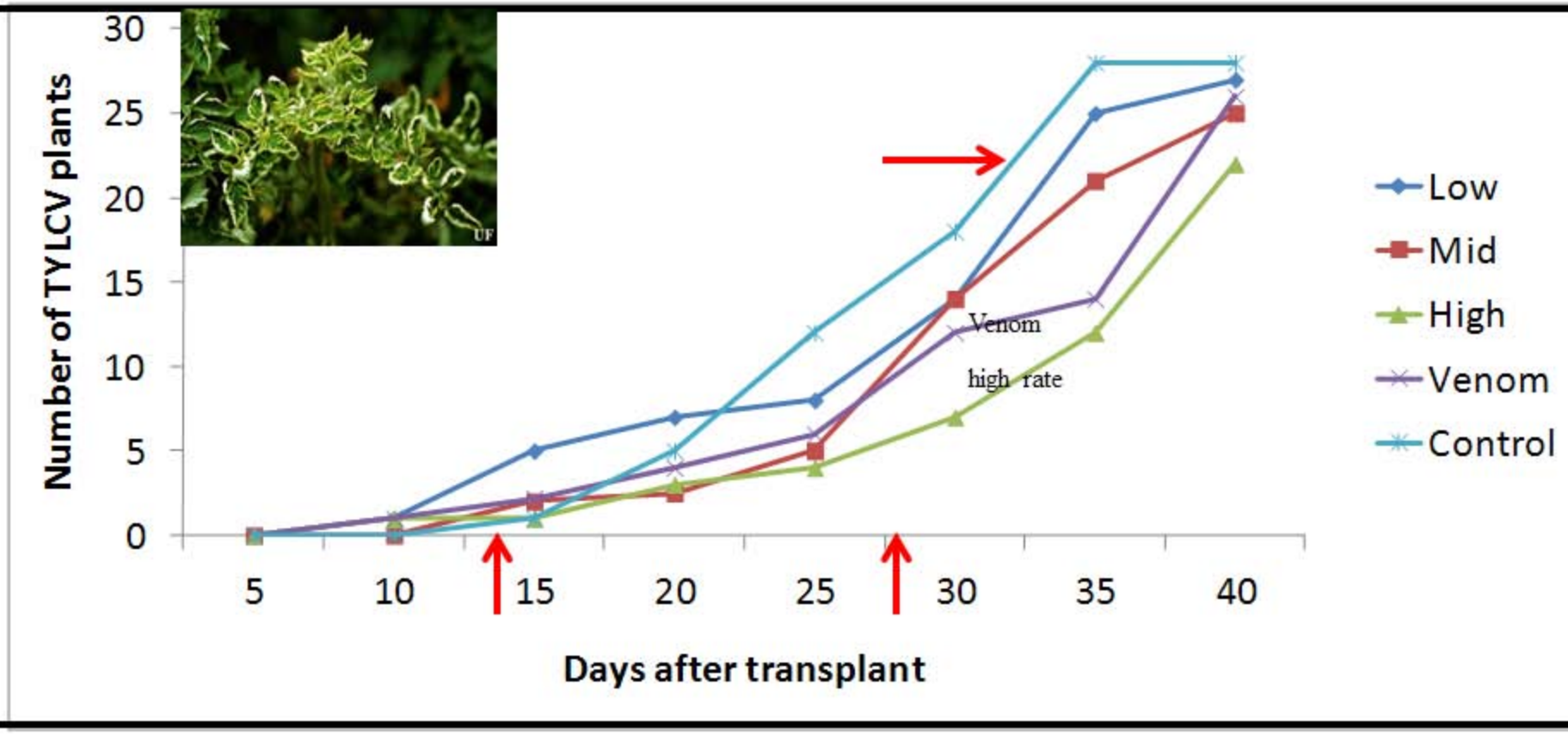


Cyazypyr: low rate (13.46 fl oz.), mid rate (16.82 fl oz), high rate (20.5 fl oz)

Abundance of *F. schultzei* was low

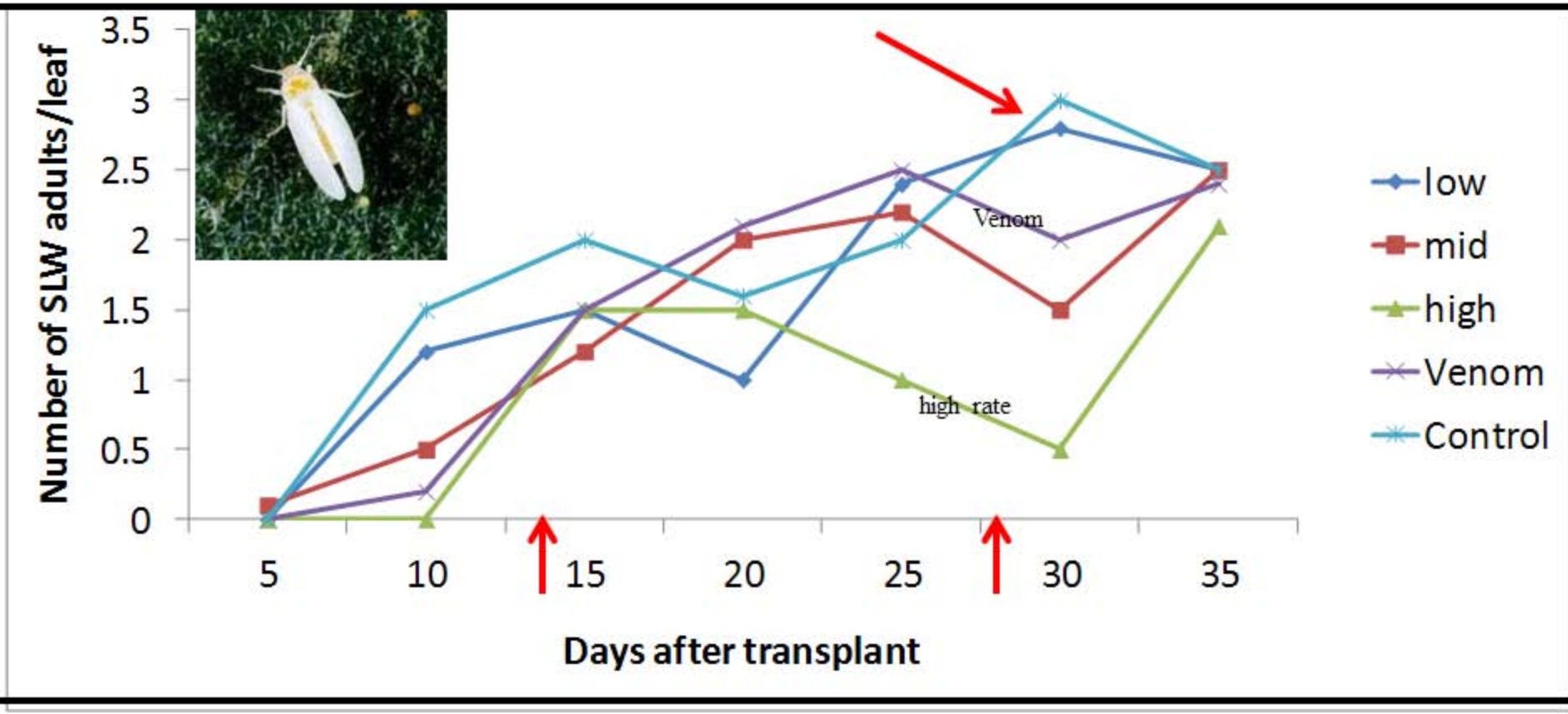
Population in untreated control increased significantly after the second spray.

Management of TYLCV applying Admire (soil drench) And Cyazypyr (foliar) in a program, TREC, 2012



Cyazypyr: low rate (13.46 fl oz.), mid rate (16.82 fl oz), high rate (20.5 fl oz)
TYLCV incidence was lower in all treatment plots than the nontreated control.
Highest rate provided better reduction of TYLCV incidence than other rates.

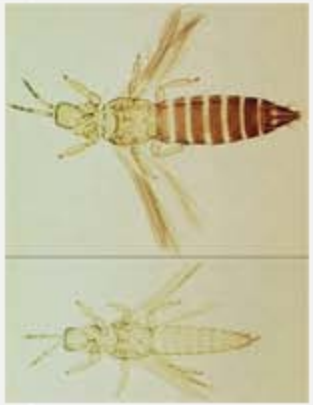
Control of silverleaf whitefly in tomato applying Admire (soil drench) and Cyazypyr (foliar) in a program , TREC, 2012



Cyazypyr: low rate (13.46 fl oz.), mid rate (16.82 fl oz), high rate (20.5 fl oz)
SLW abundance was significantly low on plants treated with Cyazypyr at 20.5 oz/acre

Control of silverleaf whitefly, Flower thrips and Common blossom thrips in tomato by applying DPX-HGW86 10SE on foliage 14 and 28 DAP

Treatments	Rate [oz]/A	Method of application	
1. Admire Pro 4.6 SC DPX-HGW86 10SE	10.5 13.46	At plant Foliar	Low
2. Admire Pro 4.6 SC DPX-HGW86 10SE	10.5 16.82	At plant Foliar	Med
3. Admire Pro 4.6 SC DPX-HGW86 10SE	10.5 0 20.5	At plant Foliar	High
4. Admire Pro 4.6 SC Venom	10.5 5.0	At plant Foliar	
5. Untreated check			



MSO was added at the rate of 0.25% v/v

DPX-HGW86 or Cyzypyr

- **Formulations:** Formulation
  - a) 10 SE: spray
  - b) 20 SC: drench
- **Rates:** 10 SE- 13.5, 16.8 and 20.5 fl oz/acre
  - 20 SC- 10.2 and 13.5 fl oz/acre
- **Method of application**
- - Spray on foliage
- – - Drench at plant
- - Drip application after planting
-

Management of SLW and *Frankliniella* thrips, vectors of TYLCV and GRSV, in tomatoes using new insecticide-DPX HGW 86, Cyzypyr

LC_{50} (CL 95%) of three populations of silverleaf whitefly



Insecticides	LC_{50} (CL 95%) TYLCV	LC_{50} (CL 95%) BGMV	LC_{50} (CL 95%) Laboratory
Imidacloprid	11.25 (6.95-15.65)a	10.50 (3.52 – 18.26)a	8.94 (5.24 – 12.70)a
Thiamethoxam	12.96 (7.02 – 19.42)a	20.04 (9.90 – 231.27)ab	14.24 (8.68 – 20.09)a
Acetamiprid	15.06 (10.81 – 20.19)a	12.89 (8.96 – 17.67)a	11.55 (8.13 – 15.43)a
Endosulfan	33.60(13.99 – 68.08)a	54.52 (29.83 – 92.99)b	35.29 (26.43 – 46.27)b
Buprofezin[1]	-	-	-
Pyriproxyfen[1]	-	-	-

Failure of 95% CL to overlap was the criterion used to determine significant differences among the treatements.

Table 3. Response of *Bemisia argentifolii* adults to various insecticides in a bioassay study- adults were raised on disease free tomato plants.

Insecticides	Slope ± SE	LC_{50} (CL 95%)	LC_{90} (CL 95%)
Imidacloprid	1.42 ± 0.19	8.94 (5.24 – 12.70)a	71.50 (53.64 – 106.82)a
Thiamethoxam	1.21 ± 0.16	14.24 (8.68 – 20.09)a	161.94 (112.19 – 278.14)b
Acetamiprid	1.22 ± 0.15	11.55 (8.13 – 15.43)a	130.60 (83.39 – 256.54)ab
Endosulfan	1.31 ± 0.15	35.29 (26.43 – 46.27)b	333.89 (210.86 – 666.32)b
Buprofezin[1]	-	-	-
Pyriproxyfen[1]	-	-	-

Failure of 95% CL to overlap was the criterion used to determine significant differences among the treatements.

Table 2. Response of *Bemisia argentifolii* adults to various insecticides in a bioassay study- adults were raised on BGMV infected bean plants.

Insecticides	Slope ± SE	LC_{50} (CL 95%)	LC_{90} (CL 95%)
Imidacloprid	1.17 ± 0.12	10.50 (3.52 – 18.26)a	130.99(77.88-352.45)a
Thiamethoxam	1.13 ± 0.14	20.04 (9.90 – 231.27)ab	267.62(151.42-763.54)a
Acetamiprid	0.93 ± 0.13	12.89 (8.96 – 17.67)a	310.22(158.70-945.88)a
Endosulfan	1.24 ± 0.18	54.52 (29.83 – 92.99)b	589.03(264.18-3711.49)a
Buprofezin[1]	-	-	-
Pyriproxyfen[1]	-	-	-

Failure of 95% CL to overlap was the criterion used to determine significant among the treatements.

Table 1. Response of *Bemisia argentifolii* to various insecticides in a bioassay study- adults were raised on TYLCV infected tomato plants.

Insecticides	Slope ± SE	LC_{50} (CL 95%)	LC_{90} (CL 95%)
Imidacloprid	1.38 ± 0.18	11.25 (6.95-15.65)a	94.93 (69.99 – 146.16)a
Thiamethoxam	1.06 ± 0.15	12.96 (7.02 – 19.42)a	207.77 (134.96 – 406.25)ab
Acetamiprid	1.15 ± 0.14	15.06 (10.81 – 20.19)a	196.31 (117.60 – 433.27)ab
Endosulfan	1.54 ± 0.15	33.60(13.99 – 68.08)a	433.70 (162.73 – 7509.02)b
Buprofezin[1]	-	-	-
Pyriproxyfen[1]	-	-	-

Failure of 95% CL to overlap was the criterion used to determine significant differences among the treatements.

Insecticides

Insecticides	Common name	Trade name	Rate (ppm)	IRAC Gr.
Conventional	Imidacloprid	Admire® 2SC	10.675 – 340	4A
	Thiamethoxam	Platinum® 2SC	10.675 – 340	4A
	Acetamiprid	Assail® 30SG	3.125 – 100	4A
	Endosulfan	Thiodan® EC	5.760 – 168.5	2A
IGR	Buprofezin	Applaud® 70 WP	3.125 – 100	16
	Pyriproxyfen	Knack®	3.125 – 100	7C

Justification of this study

	Tomato	Bean
Acreages	200-500	12,000-17,000
Cost/acre	Low value	High value
Insect pest complex	Multiple pests	Multiple pests
Common pests	SLW, leafminers, mites	SLW, leafminers, mites
SLW transmitted disease	TYLCV	BGMV
Pest management	Insecticide	Insecticide
Common insecticides for both crops	Neonicotinoid, pyrethroids, IGR, spinetoram, spiromesifen	Almost same
Growing season	October - May	October – May

Response of two populations of SLW to six select insecticides

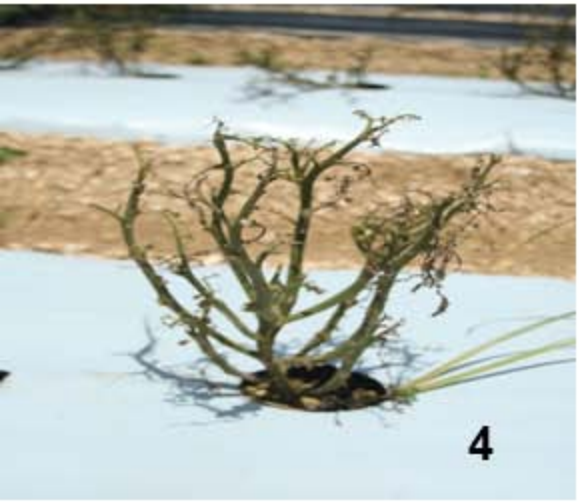
- Populations of SLW:
- a. SLW raised on TYLCV acquired tomato plants for three generations
- b. SLW raised on BGMV acquired tomato plants for three generations
- C. SLW raised on uninfected tomato plants for several generations.

GRSV INFECTED PEPPER PLANTS SHOWING PROGRESSION OF SYMPTOMS

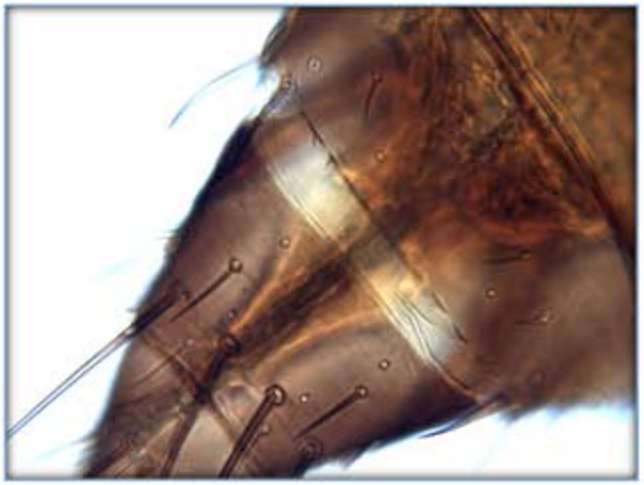
Uninfected bell pepper

Infected bell pepper

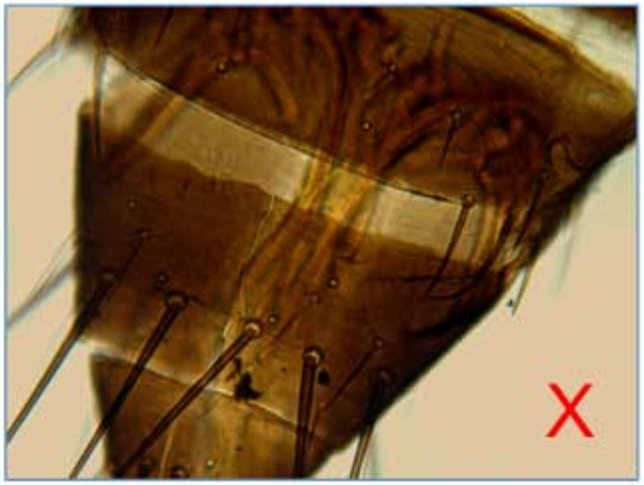
GRSV INFECTED TOMATO PLANTS SHOWING PROGRESSION OF SYMPTOMS



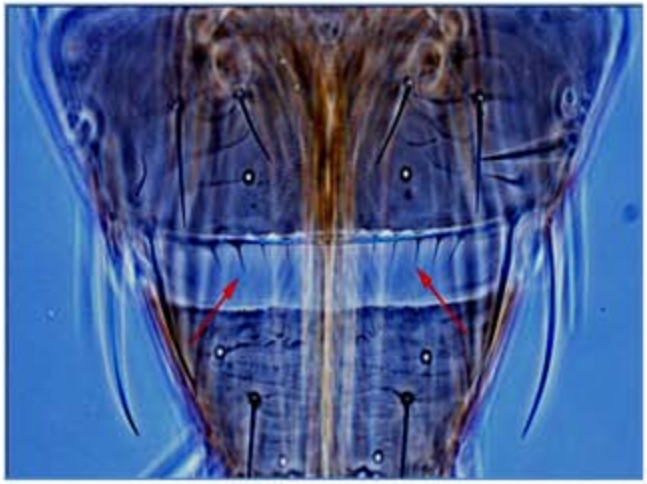
Eighth abdominal segment showing comb of microtrichia



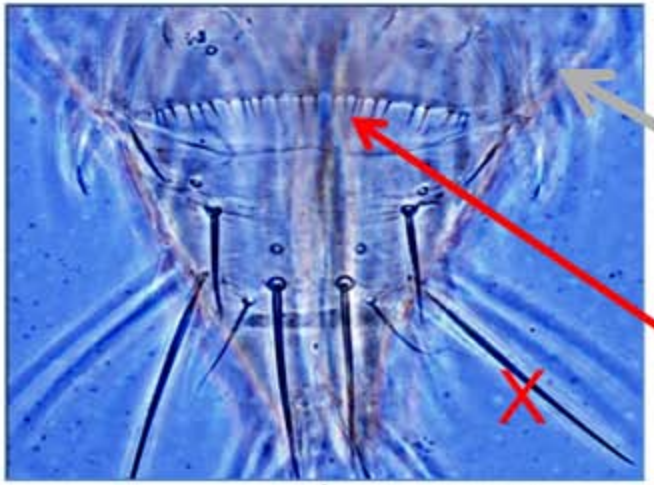
a *F. schultzei*



b *F. fusca*



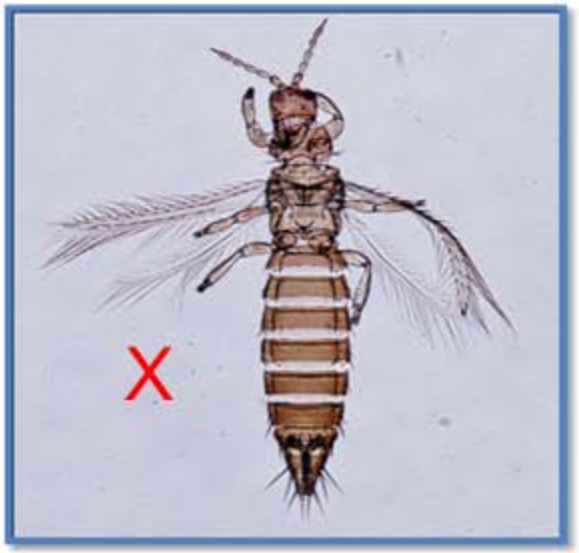
c *F. occidentalis*



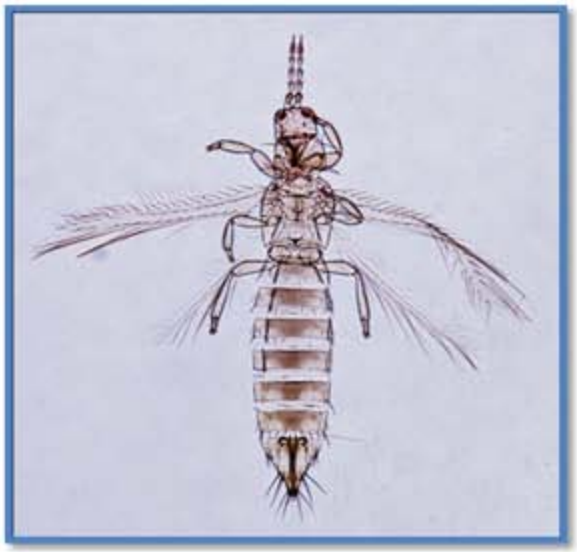
d *T. palmi*

Flower thrips adults, pests of tomat

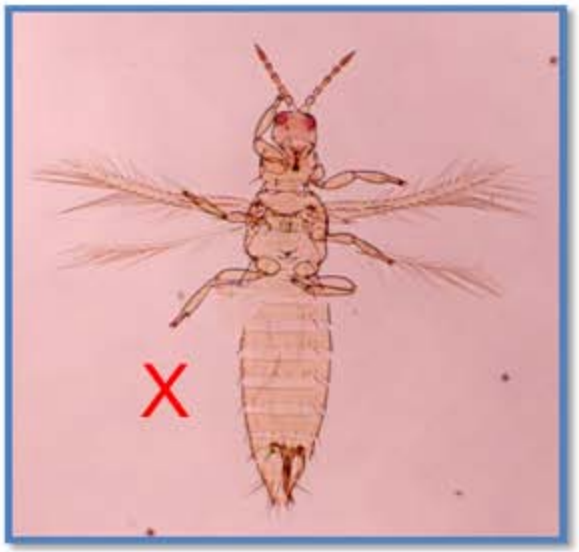
a *F. schultzei*



b *F. fusca*



c *F. occidentalis*



d *T. palmi*

Virus infected tomato and bean fields in Homestead, FL

TYLCV infected field tomato field

100% infection

BGMV infected bean field

100% infection

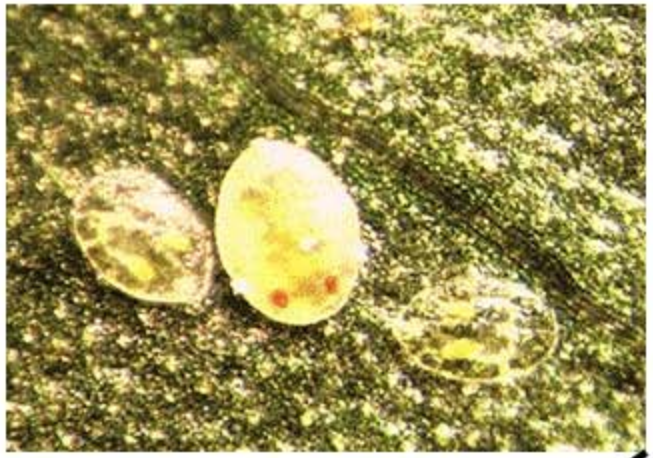
SILVERLEAF WHITEFLY-indirect damage

Tomato Yellow Leaf Curl Virus :TYLCV

Silverleaf whitefly : SLW

Bean Golden Mosaic Virus : BGMV

SILVERLEAF WHITEFLY- direct damage



Honey dew secretion and sooty mould

Feeding damage

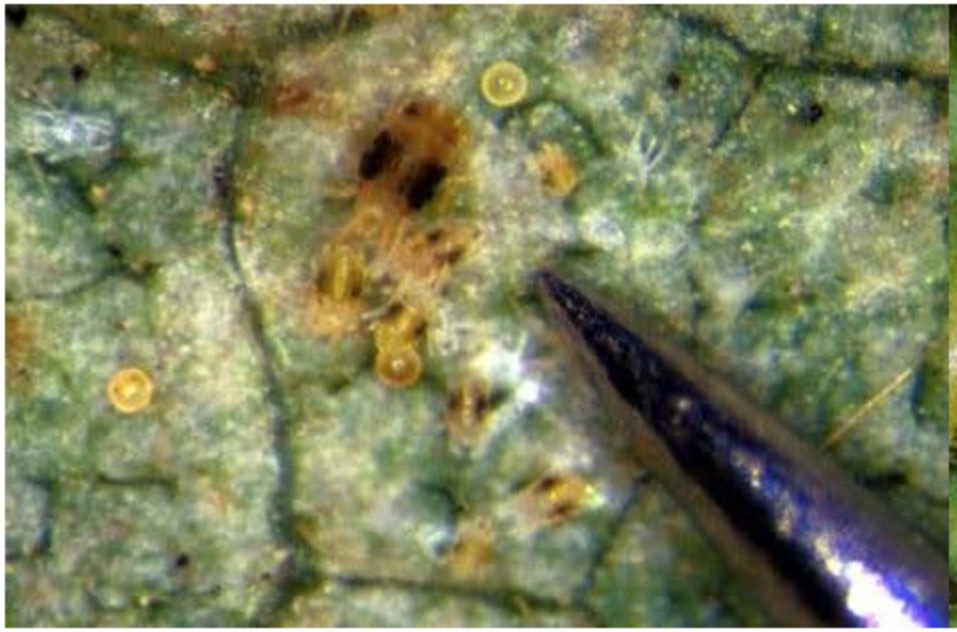
AN EXPENSIVE INSECT

- Originated in India
- Arrived in Florida in mid-1980s
- Within five years it became established widely in the USA
- On national scale, US has suffered $ 1 billion
- California suffers- $500 million in crop damage

  $774 million plant damage

  12,540 jobs

Mites and aphids



Twospotted spider mites
(Photo Credit: J. Obermeyer)

Green peach aphid

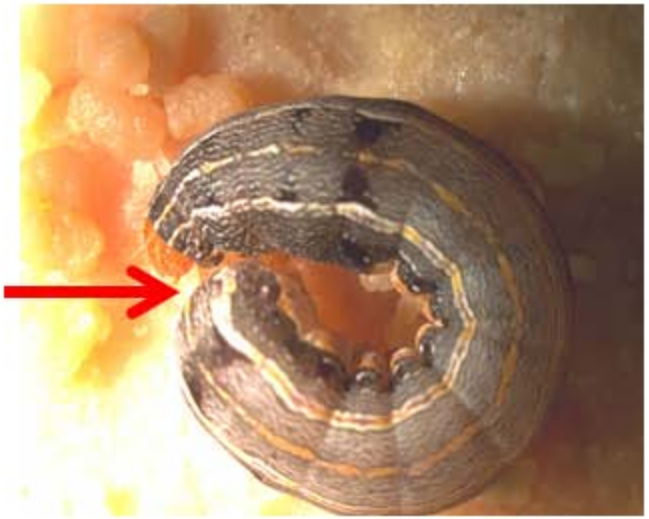
Black cutworm and Leafminer

Black cutworm
(Photo Credit: J. Obeyer)

Vegetable leafminer

Beet armyworm, *Spodoptera exigua* (Lepidoptera: Noctuidae)

Eggs



Larva

Feeding damage

Worm pests of tomato

Tomato hornworm larva
(Photo Credit: G. Burst)

Yellow striped armyworm
(Photo Credit: J.
Obermeyer)

Tomato leaf with armyworm damage

Worm pests of tomato

Tomato fruitworm larva
(Photo Credit: G. Brus

Tomato fruitworm adult
(Photo Credit: W. Cranshaw)

Important insect pests of tomato