

# BMSB Feeding and Mortality Study – 2017-18

## Comparative Efficacy of Insecticides Using Topical & Field Applied Treatments (Fruit Residue)



# 2018: Adult BMSB Topical Bioassay

- Brown marmorated stink bug (BMSB) adults were separated into individual cups, **male and female**
- Individuals **received a 2 uL application of distilled DI water, 0.25% LI700, or insecticide** to the dorsal thoractic plate.
  - Treatments: **Surround WP plus 1% Hort. Oil, Actara, Bifenthrate, Closer, Venerate & UTC**
  - **Doses: 1.0, 0.5, and 0.25** times the highest product labeled rate
- Status (**alive or dead**) was recorded **at 24, 48 hours and 7d** post treatment of three dose responses in the following data set.
- Treated and untreated adult field placement onto treated and untreated fruit from September 19<sup>th</sup> to 24<sup>th</sup> found high mortality due to high temperature.



## 24 Hour

## 48 Hour

## 7 Day

24 hour assessment						72 hour assessment						168 hour assessment					
Material	hours	rate	Proportion ALIVE	Tukeys		Material	hours	rate	Proportion ALIVE	Tukeys		Material	hours	rate	Proportion ALIVE	Tukeys	
Actara	24	0.25	0.58	B		Actara	72	0.25	0.17	C		Actara	168	0.25	0.25	B	
Bifenthrin	24	0.25	0.17	C		Bifenthrin	72	0.25	0.13	C		Bifenthrin	168	0.25	0.08	B	
Closer	24	0.25	0.67	B		Closer	72	0.25	0.75	B		Closer	168	0.25	0.38	B	
DI water	24	0.25	1.00	A		DI water	72	0.25	1.00	A		DI water	168	0.25	0.83	A	
Surround + Oil	24	0.25	0.96	A		Surround + Oil	72	0.25	0.96	A	B	Surround + Oil	168	0.25	0.83	A	
UTC LI-700	24	0.25	0.96	A		UTC LI-700	72	0.25	0.92	A	B	UTC LI-700	168	0.25	0.83	A	
Venerate	24	0.25	1.00	A		Venerate	72	0.25	1.00	A		Venerate	168	0.25	0.96	A	
P-value			0.0001			P-value			0.0001			P-value			0.0001		
24 hour assessment						72 hour assessment						168 hour assessment					
Material	hours	rate	Proportion ALIVE	Tukeys		Material	hours	rate	Proportion ALIVE	Tukeys		Material	hours	rate	Proportion ALIVE	Tukeys	
Actara	24	0.5	0.42	B		Actara	72	0.5	0.21	B		Actara	168	0.5	0.21	B	
Bifenthrin	24	0.5	0.08	C		Bifenthrin	72	0.5	0.13	B		Bifenthrin	168	0.5	0.04	B	
Closer	24	0.5	0.88	A		Closer	72	0.5	0.88	A		Closer	168	0.5	0.29	B	
DI water	24	0.5	1.00	A		DI water	72	0.5	1.00	A		DI water	168	0.5	0.83	A	
Surround + Oil	24	0.5	0.96	A		Surround + Oil	72	0.5	0.96	A		Surround + Oil	168	0.5	0.92	A	
UTC LI-700	24	0.5	1.00	A		UTC LI-700	72	0.5	0.96	A		UTC LI-700	168	0.5	0.92	A	
Venerate	24	0.5	0.96	A		Venerate	72	0.5	0.92	A		Venerate	168	0.5	0.88	A	
P-value			0.0001			P-value			0.0001			P-value			0.0001		
24 hour assessment						72 hour assessment						168 hour assessment					
Material	hours	rate	Proportion ALIVE	Tukeys		Material	hours	rate	Proportion ALIVE	Tukeys		Material	hours	rate	Proportion ALIVE	Tukeys	
Actara	24	1	0.42	B		Actara	72	1	0.25	C		Actara	168	1	0.04	C	
Bifenthrin	24	1	0.00	C		Bifenthrin	72	1	0.00	C		Bifenthrin	168	1	0.00	C	
Closer	24	1	0.83	A		Closer	72	1	0.71	B		Closer	168	1	0.38	B	
DI water	24	1	1.00	A		DI water	72	1	1.00	A		DI water	168	1	0.83	A	
Surround + Oil	24	1	0.96	A		Surround + Oil	72	1	1.00	A		Surround + Oil	168	1	0.79	A	
UTC LI-700	24	1	0.96	A		UTC LI-700	72	1	0.92	A	B	UTC LI-700	168	1	0.83	A	
Venerate	24	1	0.88	A		Venerate	72	1	0.75	A	B	Venerate	168	1	0.67	A	B
P-value			0.0001			P-value			0.0001			P-value			0.0001		

Material	Proportion ALIVE
Actara	0.42
Bifenthrin	0.00
Closer	0.83
DI water	1.00
Surround + Oil	0.96
UTC LI-700	0.96
Venerate	0.88

Material	Proportion ALIVE
Actara	0.25
Bifenthrin	0.00
Closer	0.71
DI water	1.00
Surround + Oil	1.00
UTC LI-700	0.92
Venerate	0.75

Material	Proportion ALIVE
Actara	0.04
Bifenthrin	0.00
Closer	0.38
DI water	0.83
Surround + Oil	0.79
UTC LI-700	0.83
Venerate	0.67

Graph data represents efficacy using the highest labeled rate for each product tested.

# 2017: Adult BMSB Topical Bioassays

- Brown marmorated stink bug (BMSB) adults were separated into individual cups, **male and female**
- Individuals **received 2 uL of distilled water, 0.25% LI700**, individual insecticide to the dorsal thoracic plate.
  - Treatments: **Actara, Bifenthrate, Closer, Venerate, UTC**
  - **Doses: 1, 0.5, 0.25, and 0.1** times the highest labeled rate
- Status (**alive, moribund, dead**) was recorded **at 24, 48, 72 hours and at 7d** post treatment.





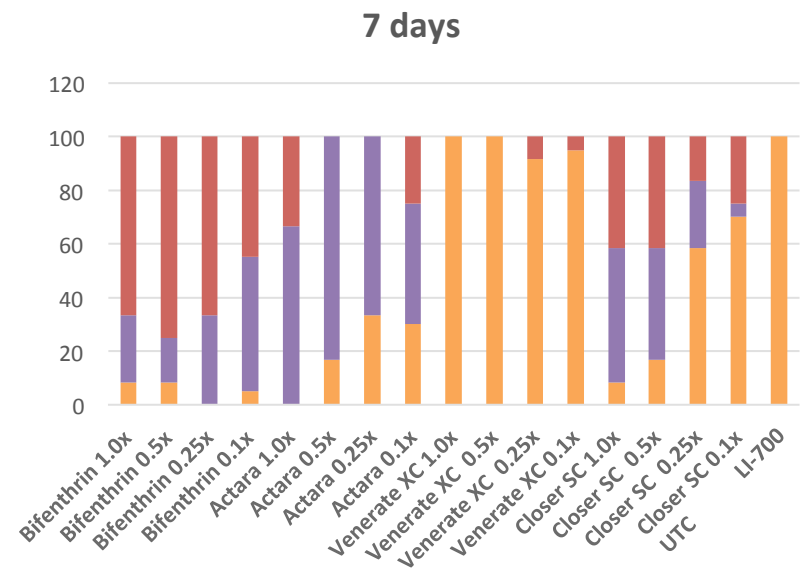
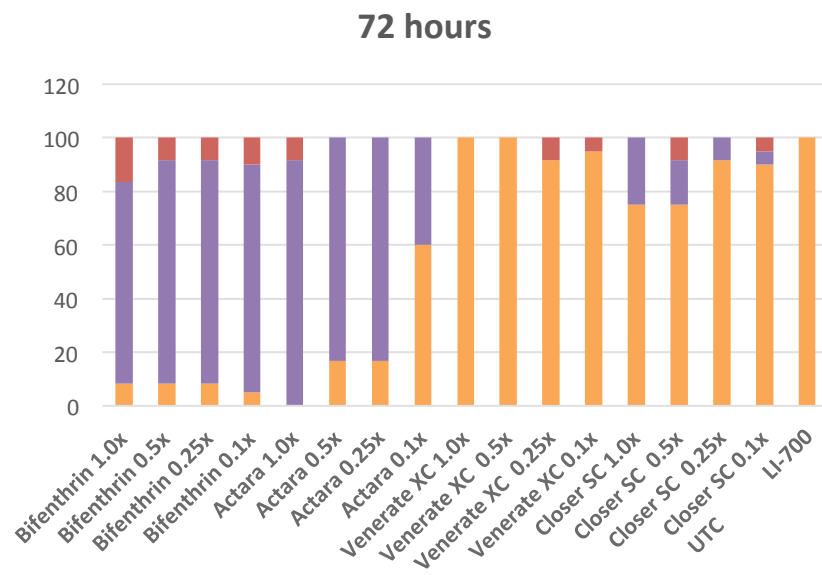
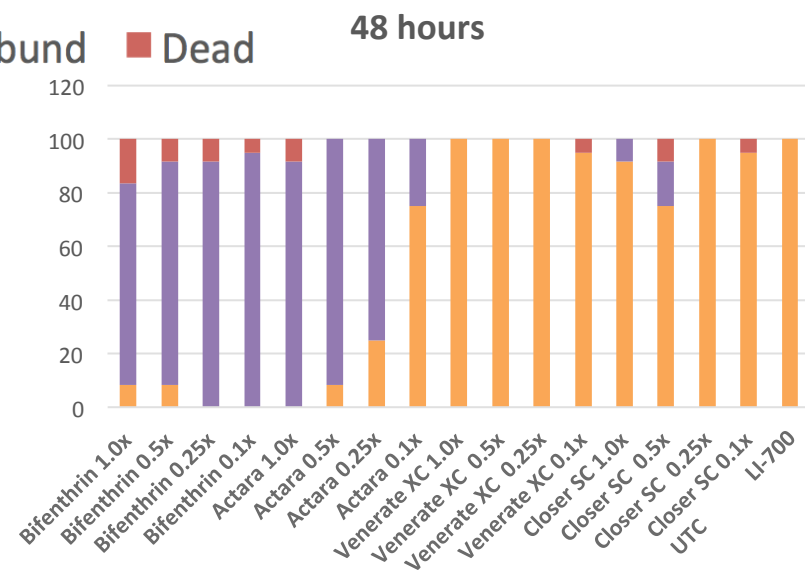
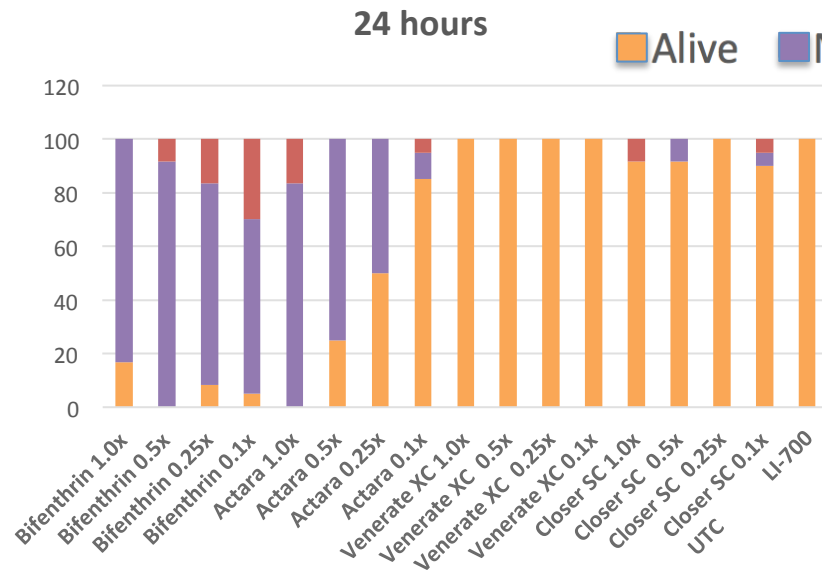
# BMSB Adult Topical Treatment

- Applications to BMSB adults on 28<sup>th</sup> Sept. 2017
- Placed on the tree in 10 replicates for each treatment
- BMSB were removed after 7d and evaluated for mortality
- Fruit was collected on 12<sup>th</sup> October
- Fruit feeding evaluations to assess feeding injury
- Evaluated 'arena' for surface dimpling,





# Topical Bioassays



# BMSB Adult Topical Treatment

**BMSB treated topically on Sep.28, 2017 and placed on apples for 7 days.**

	Number of feeding sites per fruit	Dimpling per fruit	Corking per fruit	Clean fruit (%)	Survival (%)
<b>Closer SC</b>	0.3a	0.2a	0.2a	90a	30b
<b>Bifenthrin</b>	0.1a	0a	0a	90a	0b
<b>Actara</b>	0a	0a	0a	100a	10b
<b>Venerate</b>	0a	0a	0a	100a	100a
<b>UTC</b>	0.9a	0a	0a	60a	90a
Kruskal-Walis Test, Prob>ChiSq	0.1288	0.5348	0.5348	0.1093	<.0001

Means followed by the same letter are not significantly different by Steel-Dwass Method at  $\alpha=0.05$  Apples were rated on Oct.12, 2017. BMSB survival were recorded 7 days after exposure to the fruit.

# 2017 Field Application

Applications using tractor mounted sprayer on 20<sup>th</sup> Sept. 300 psi. handgun applications:

• <b>Closure SC</b>	<b>7d PHI</b>	<b>5.75 fl.oz./A</b>
• <b>Bifenthrin SC</b>	<b>14d PHI</b>	<b>32.0 fl.oz./A</b>
• <b>Actara 25 WDG</b>	<b>14d PHI</b>	<b>5.5 oz./A</b>
• <b>Venerate XC</b>	<b>0d PHI</b>	<b>128.0 fl.oz./A</b>



- BMSB adults placement beginning on 20<sup>th</sup> Sept.
  - 24h; 48hr; 72hr placement. Collection made after 7d of placement.
  - Insects placed in screened portion cups onto the north side of fruit to reduce sun exposure with arena defined using marker.
  - Fruit harvested on 12 Oct. for fruit feeding evaluations



# Field Application: Fruit Residue

**BMBS placed on apples 24 hours after pesticide application on Sep.20, 2017.**

	Number of feeding sites per fruit	Dimpling per fruit	Corking per fruit	Clean fruit (%)	Survival (%)
<b>Closer SC</b>	0.1a	0.1a	0.1a	90a	0a
<b>Bifenthrin</b>	0a	0a	0a	100a	0a
<b>Actara</b>	0a	0a	0a	100a	0a
<b>Venerate</b>	0a	0a	0a	100a	20a
<b>UTC</b>	0.7a	0a	0a	50a	20a
Kruskal-Walis Test, Prob>ChiSq	0.0115	0.8123	0.8123	0.0136	0.3071

Means followed by the same letter are not significantly different by Steel-Dwass Method at  $\alpha=0.05$  Apples were rated on Oct.12, 2017. BMSB survival were recorded 7 days after exposure to the fruit.

# Field Application: Fruit Residue

**BMBS placed on apples 48 hours after pesticide application on Sep.20, 2017.**

	Number of feeding sites per fruit	Dimpling per fruit	Corking per fruit	Clean fruit (%)	Survival (%)
<b>Closer SC</b>	0.1b	0.1a	0.1a	90a	0a
<b>Bifenthrin</b>	0b	0a	0a	100a	10a
<b>Actara</b>	0.1b	0.1a	0.1a	90a	0a
<b>Venerate</b>	0.2ab	0a	0a	80ab	40a
<b>UTC</b>	1.2a	0.4a	0.4a	20b	0a
Kruskal-Walis Test, Prob>ChiSq	0.0001	0.4313	0.4313	0.0002	0.0873

Means followed by the same letter are not significantly different by Steel-Dwass Method at  $\alpha=0.05$  Apples were rated on Oct.12, 2017. BMSB survival were recorded 7 days after exposure to the fruit.

# Field Application: Fruit Residue

**BMBS placed on apples 72 hours after pesticide application on Sep.20, 2017.**

	Number of feeding sites per fruit	Dimpling per fruit	Corking per fruit	Clean fruit (%)	Survival (%)
Closer SC	0.2a	0.2a	0.2a	90a	80a
Bifenthrin	0.2a	0.2a	0.2a	90a	10b
Actara	0.2a	0.2a	0.2a	90a	100a
Venerate	0.1a	0a	0a	90a	70a
UTC	1.2a	0.1a	0.1a	40a	30ab
Kruskal-Walis Test, Prob>ChiSq	0.0687	0.9254	0.9254	0.0795	0.0006

Means followed by the same letter are not significantly different by Steel-Dwass Method at  $\alpha=0.05$  Apples were rated on Oct.12, 2017. BMSB survival were recorded 7 days after exposure to the fruit.