

# Comparison of insecticide efficacies against BMSB adults

Regional BMSB insecticide bioassays project – 2017 summary



**George Hamilton** (*Rutgers U.*),  
**Peter Jentsch** (*Cornell U.*),  
**Greg Krawczyk** (*PSU*),  
**Tom Kuchar** (*VA Tech*),  
**Jim Walgenbach** (*NC State*) and  
**Celeste Welty** (*OSU*).

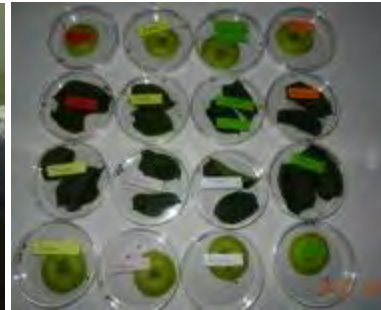
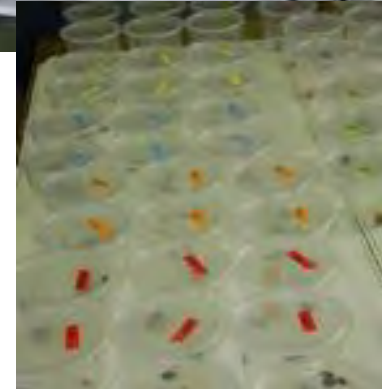


This material is based upon work that is supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, Specialty Crop Research Initiative under award number 2016-51181-25409:

**“Management of BMSB in US Specialty Crops”**



# Evaluations of insecticide efficacies against BMSB (PSU 2010-2011)



# Most effective insecticides against BMSB

*(based on combined data from T. Leskey, T. Kuchar and G. Krawczyk)*

## PYRETHROIDS

IRAC Group 3A

bifenthrin  
**(Brigade)**

fenpropathrin  
**(Danitol)**

cyfluthrin  
**(Baythroid)**

$\lambda$ -cyhalothrin  
**(Warrior)**

## NEONICOTINOIDS

IRAC Group 4A

dinotefuran  
**(Venom, Scorpion)**

thiametoxam  
**(Actara)**

clothianidin  
**(Belay)**

imidacloprid  
**(Provado, Admire Pro)**

acetamiprid  
**(Assail)**

## OTHER

(IRAC Group 1A, )

methomyl  
(carbamate)  
**(Lannate LV and SP)**



**PennState**

College of Agricultural Sciences



## 2017 BMSB Insecticide resistance testing: Methods



Product	Rate	Max field rate
bifenthrin (Bifenture EC)	0.103 ml/100ml	12.8 fl oz/ac
thiametoxam (Actara)	0.041 g/100ml	5.5 oz/ac

*Tested insecticide concentrations are equivalents of 10%, 25%, 50% and 100% of recommended full field rate*



# Insecticide activity against BMSB

Direct contact topical bioassays - 2017

## Subject

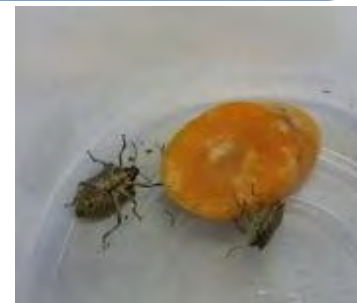
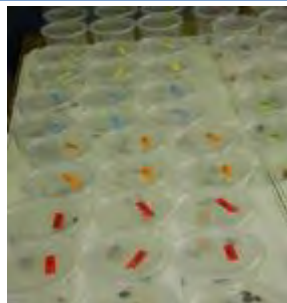
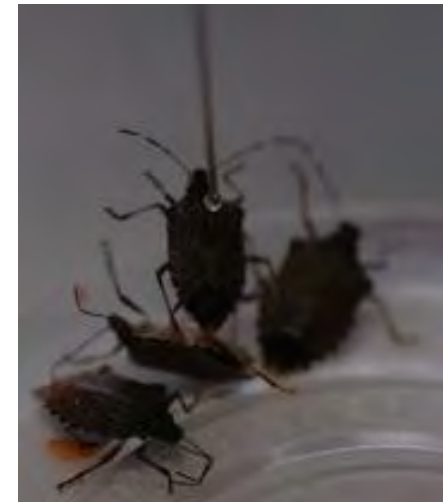
- Field collected BMSB adults
- Geographically distinct populations (OH, NC, NJ, NY, PA, VA)
- Male ( $n=10 - 40$ ) and female ( $n=8 - 40$ ) tested separately

## Test

- Commercial grade insecticide solutions at equivalent of max label based field rate (100 gal/acre), surfactant added;
- Each individual bug treated directly with  $2 \mu\text{l}$  of solution

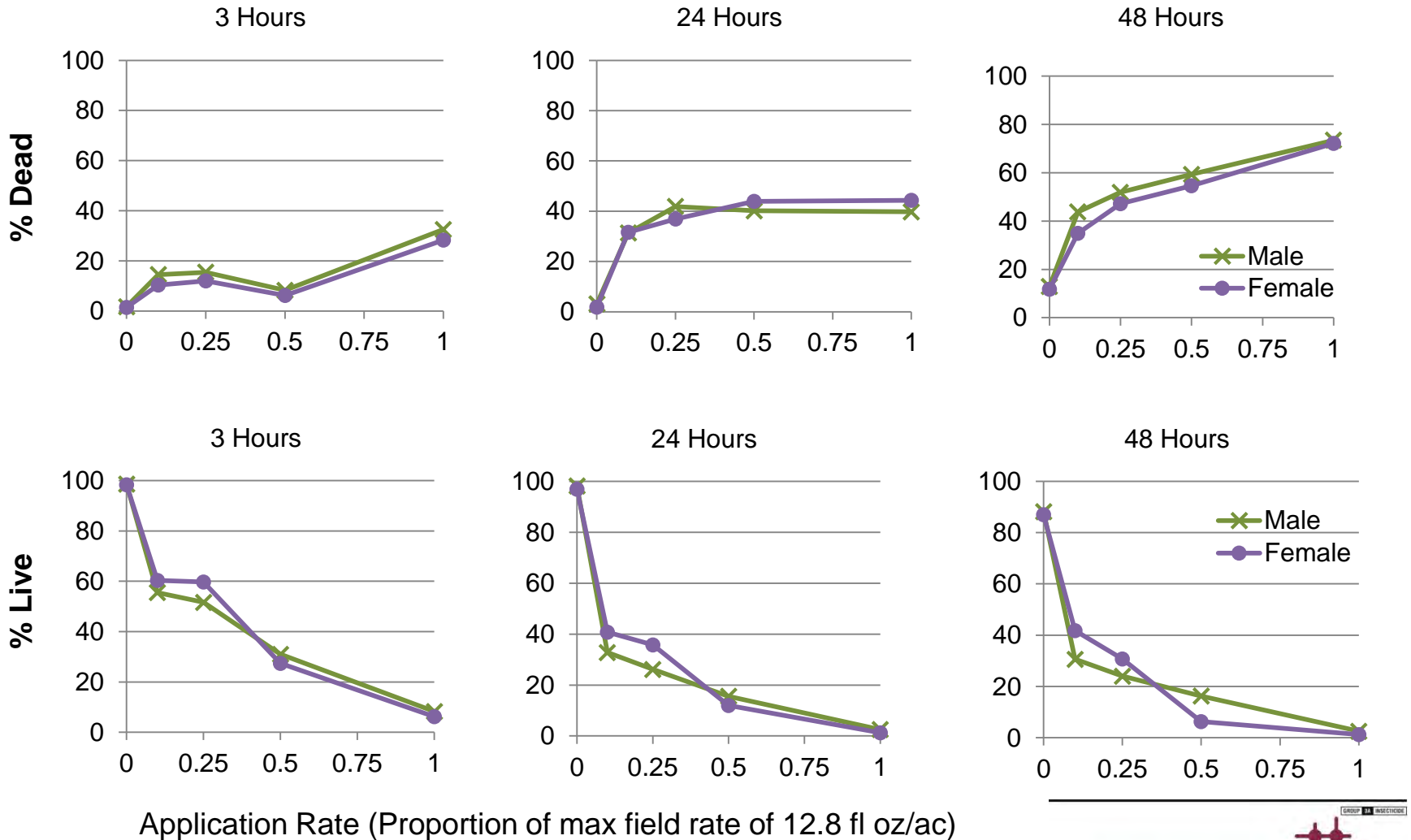
## Results

- Mortality assessed at 3, 24 and 48 hours after treatment
- Response categories – live, dead, moribund



# BMSB bifenthrin bioassays – 2017

Males vs females comparison – all BMSB populations combined

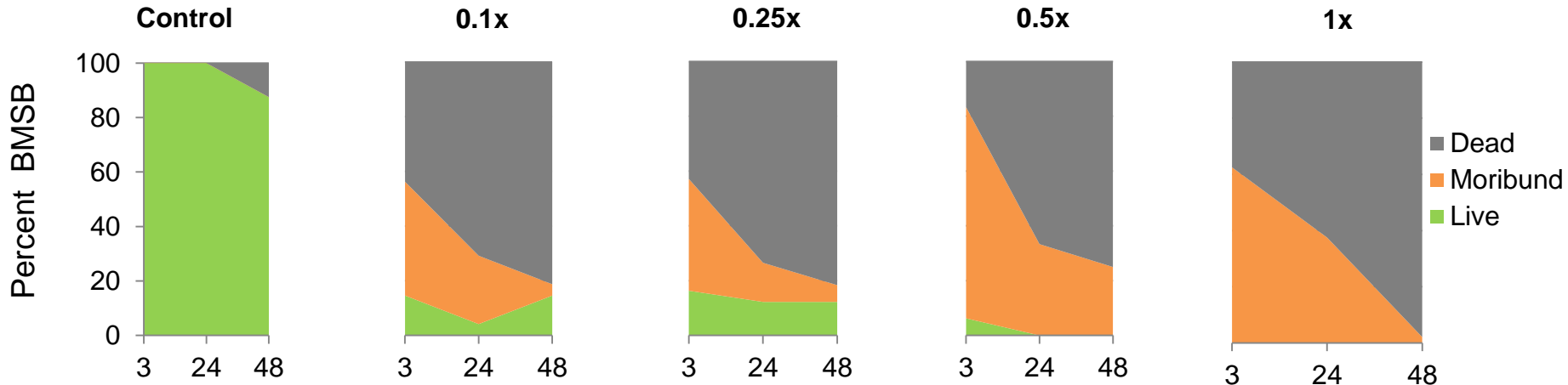


Application Rate (Proportion of max field rate of 12.8 fl oz/ac)

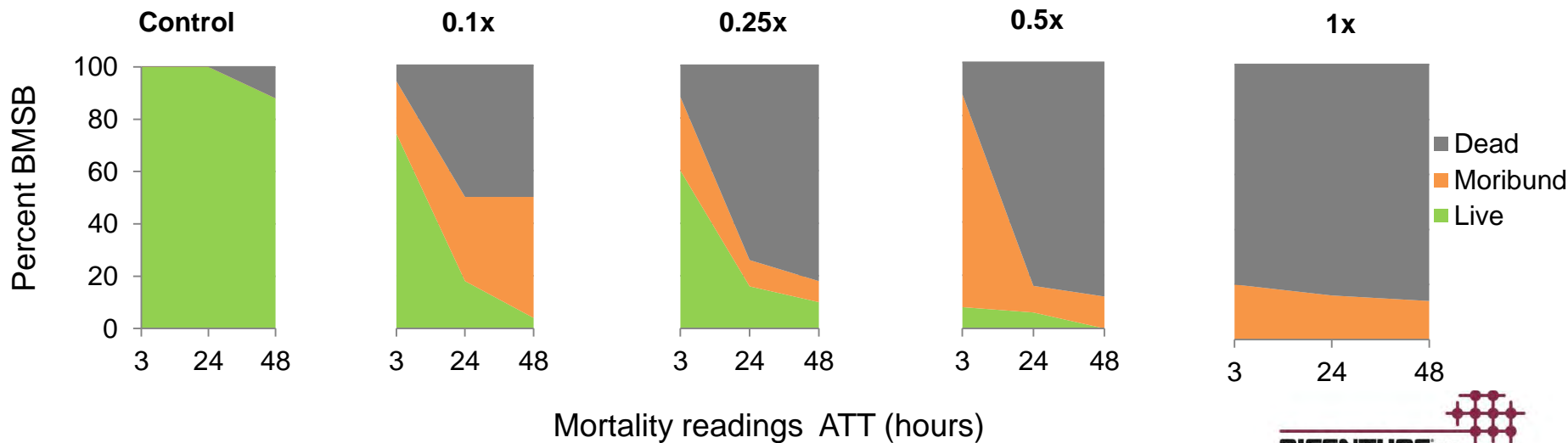
# BMSB bifenthrin bioassays – 2017

Individual BMSB populations – the moribund category dilemma

*PA BMSB population*

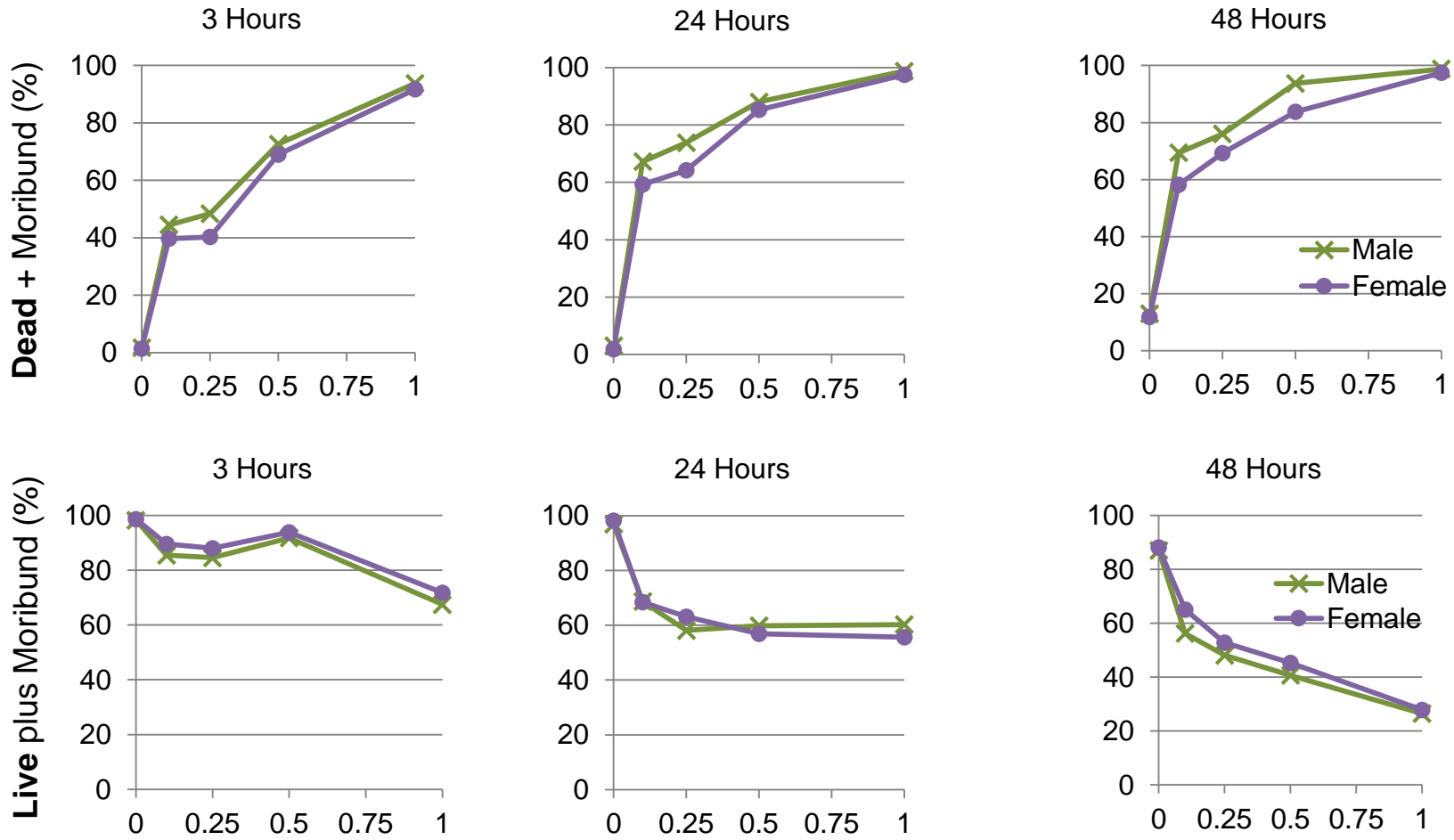


*VA BMSB population*



# BMSB bifenthrin bioassays – 2017

Males vs females comparison – all BMSB populations combined

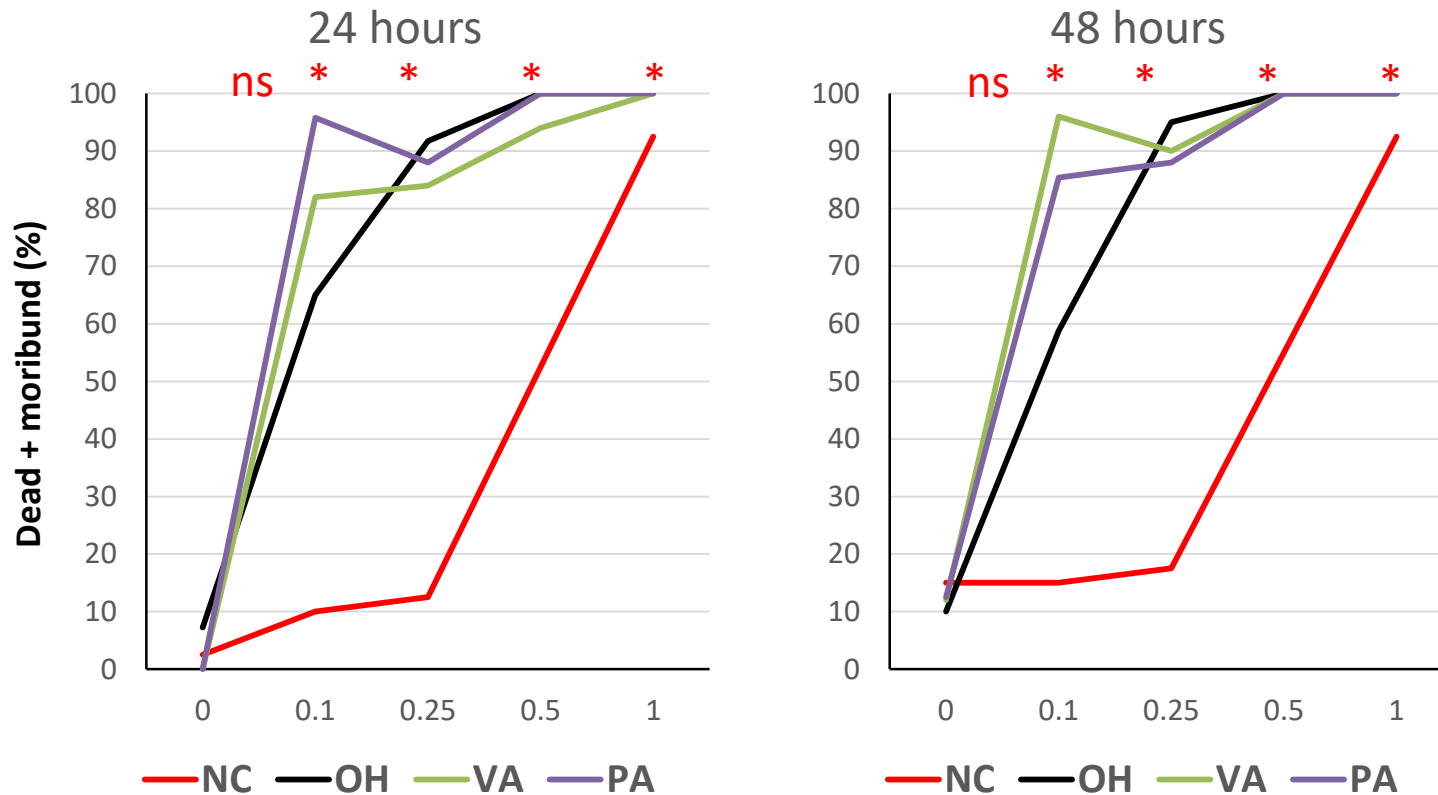


Application Rate (Proportion of max field rate of 12.8 fl oz/ac)



# BMSB bifenthrin bioassays – 2017

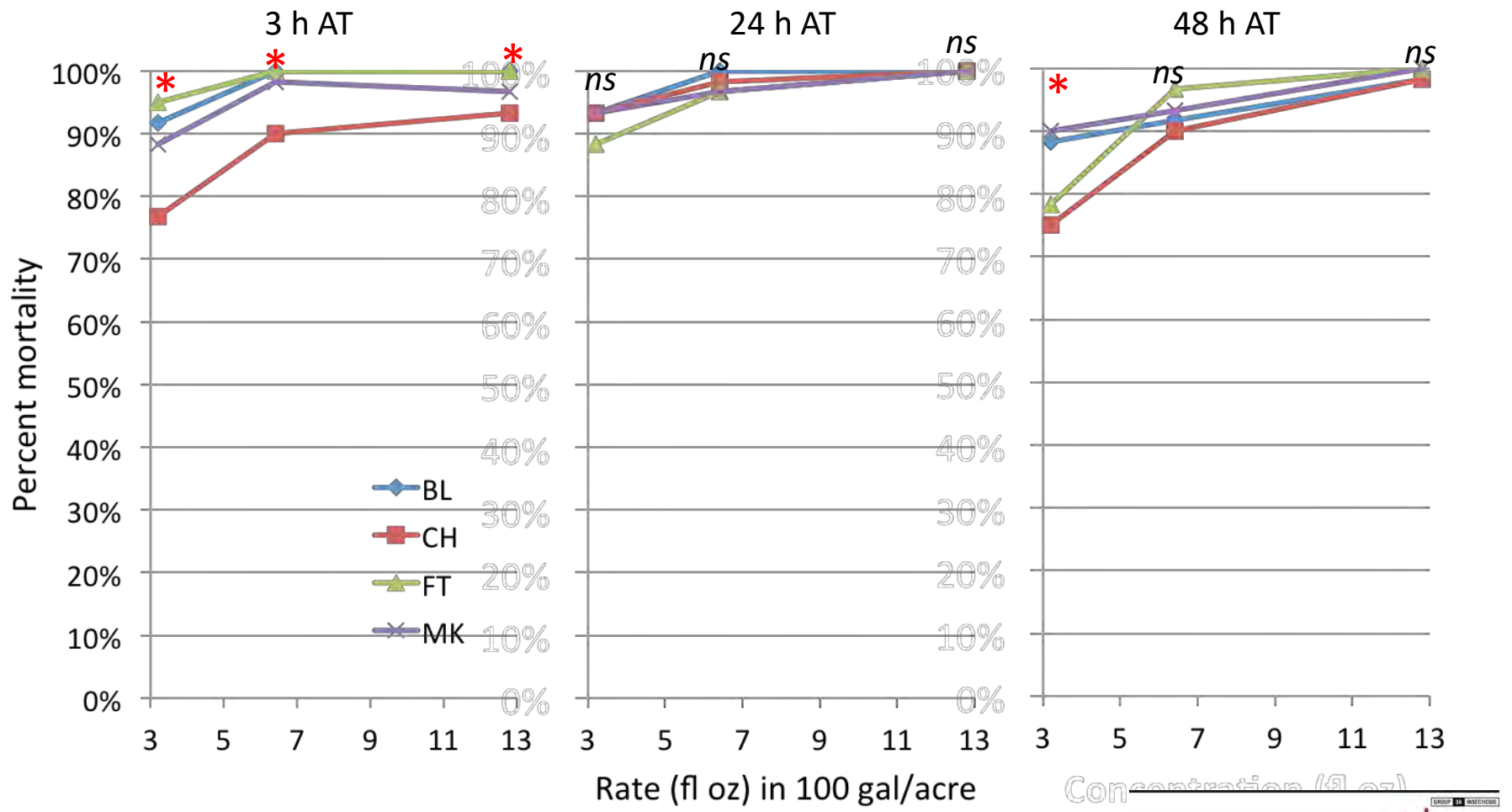
Comparison of BMSB populations – males and females combined



\* - significant at  $P \leq 0.05$  (ANOVA, Fisher's Protected LSD, sqrt transformation)

# 2014 BMSB insecticide resistance testing: bifenthrin (Bifenture EC)

(dead plus moribund BMSB adults)

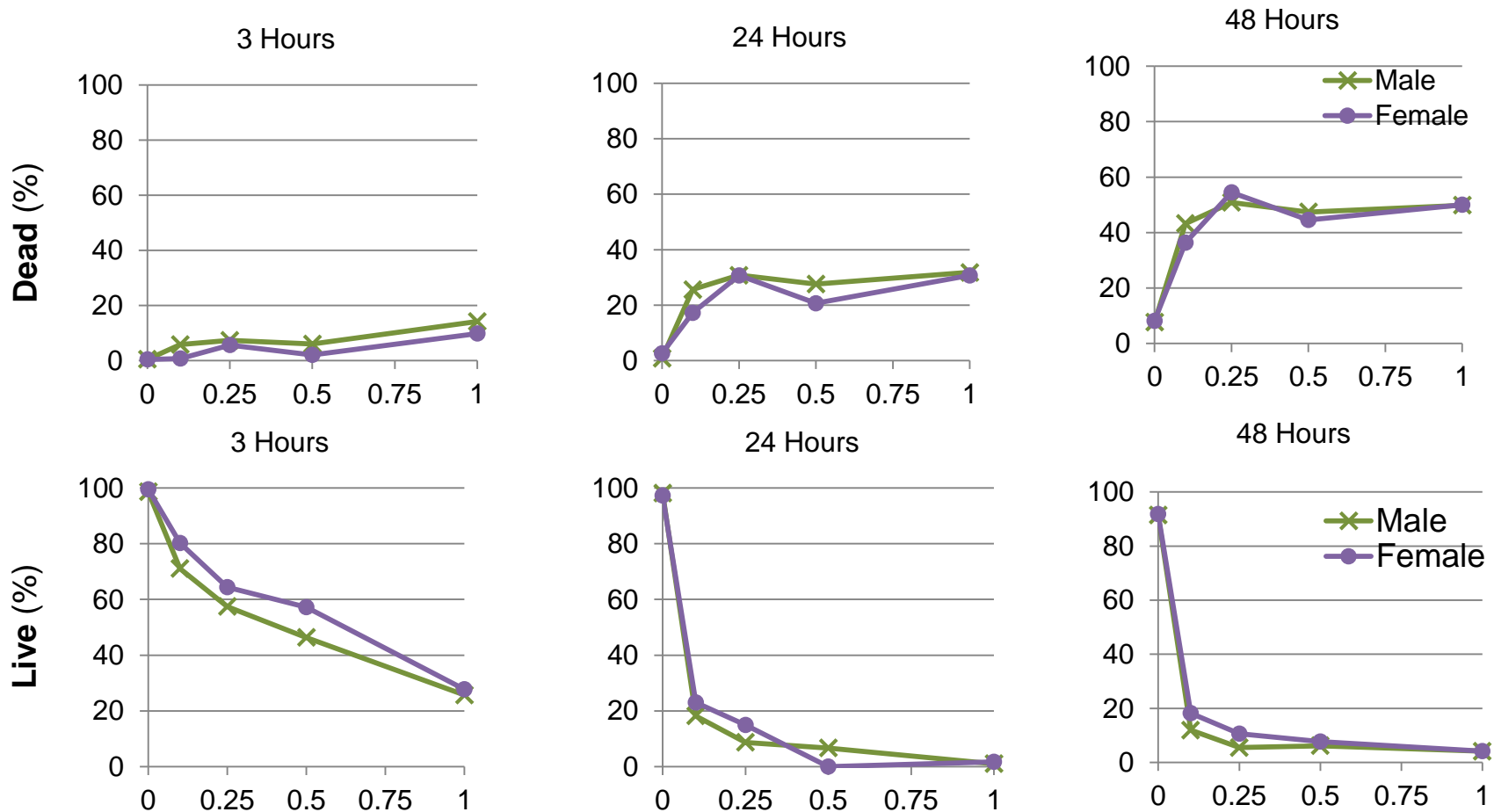


\* - significant at  $P \leq 0.05$  (ANOVA, Fisher's Protected LSD, arcsin transformation)



# BMSB thiametoxam bioassays – 2017

Males vs females comparison – all BMSB populations combined

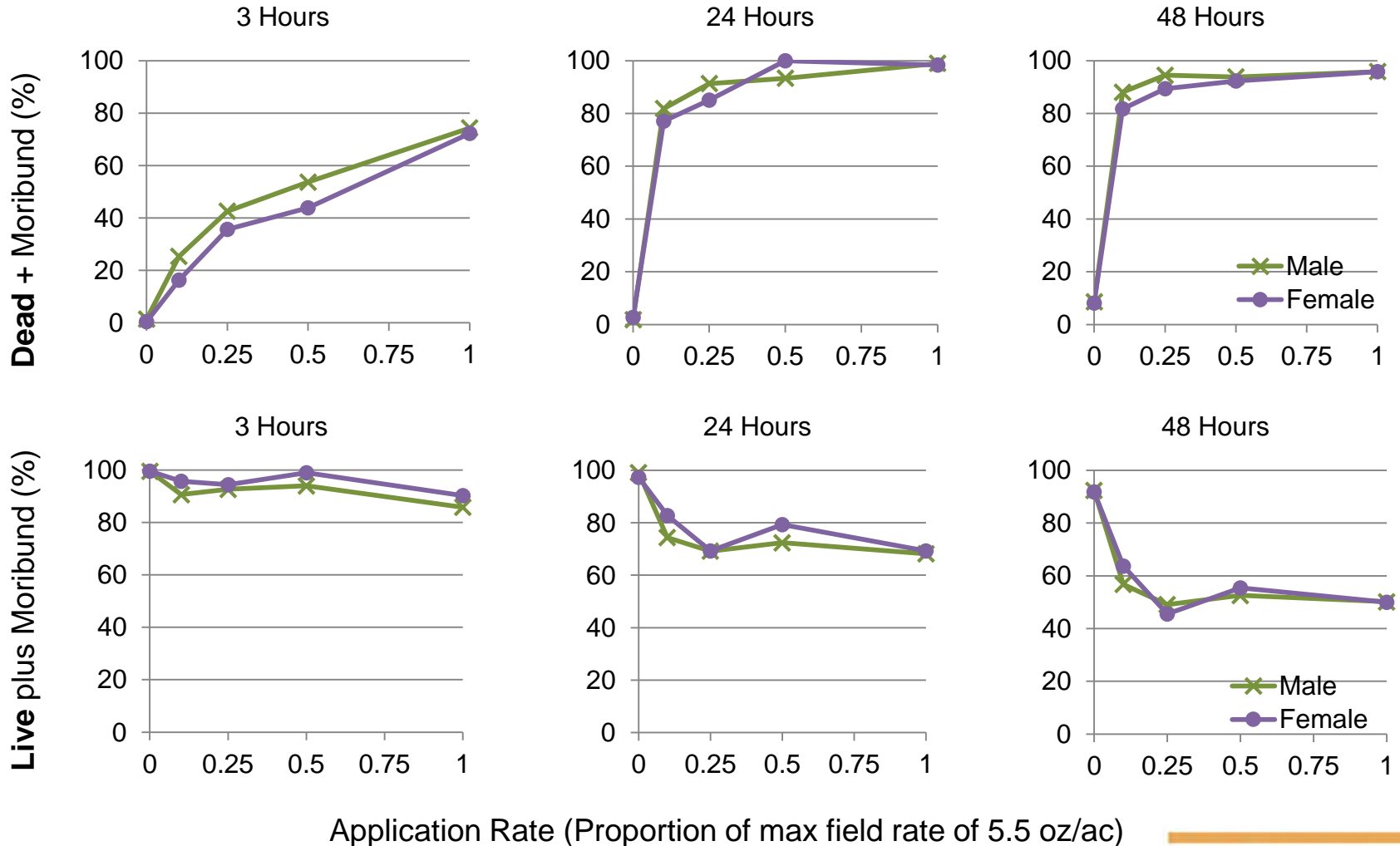


Application Rate (Proportion of max field rate of 5.5 oz/ac)



# BMSB thiametoxam bioassays – 2017

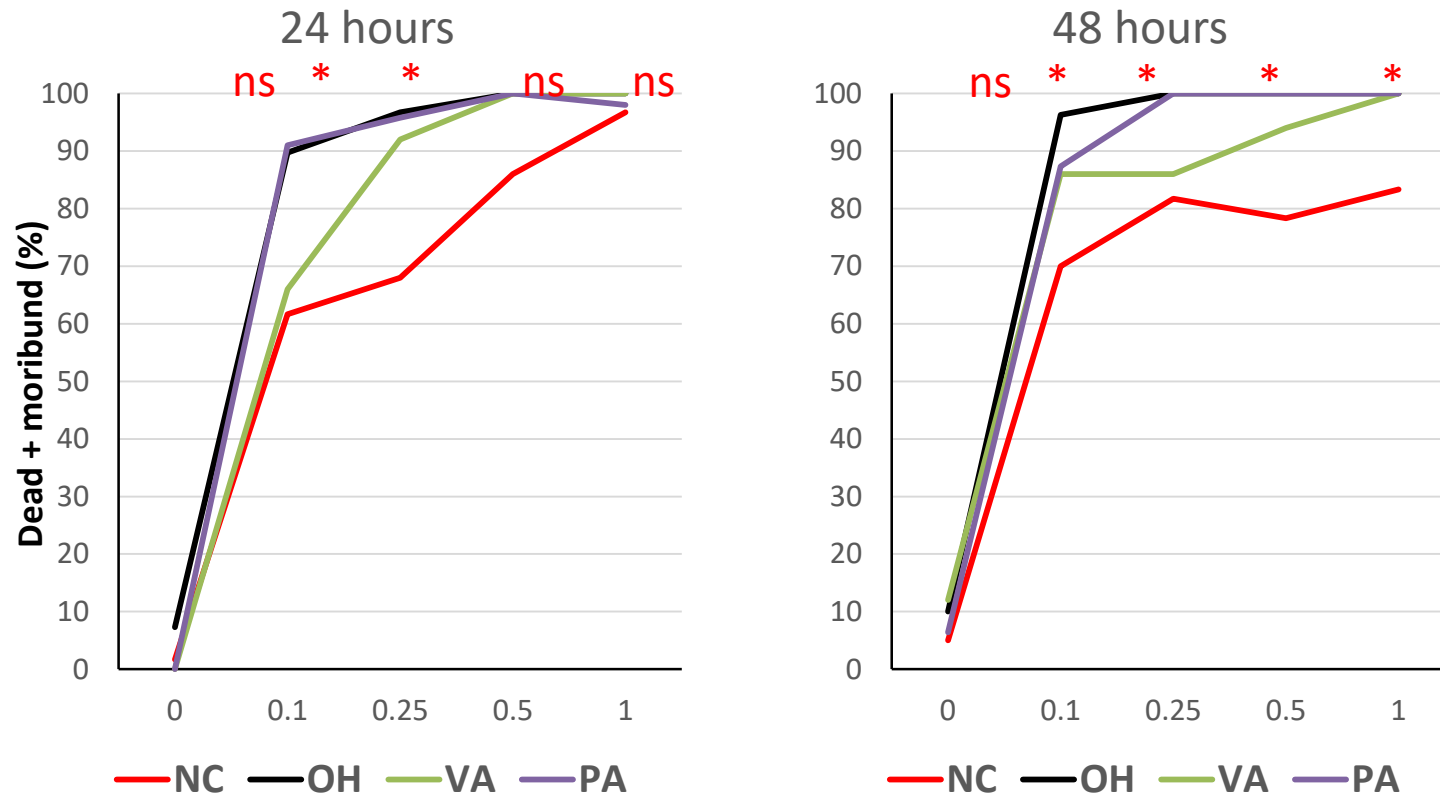
BMSB males vs females comparison – all populations combined



Application Rate (Proportion of max field rate of 5.5 oz/ac)

# BMSB thiametoxam bioassays – 2017

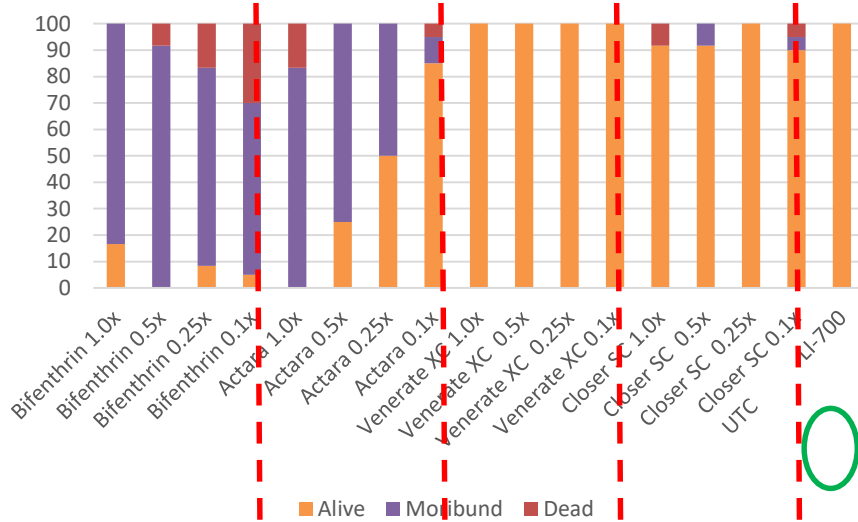
Comparison of BMSB populations – males and females combined



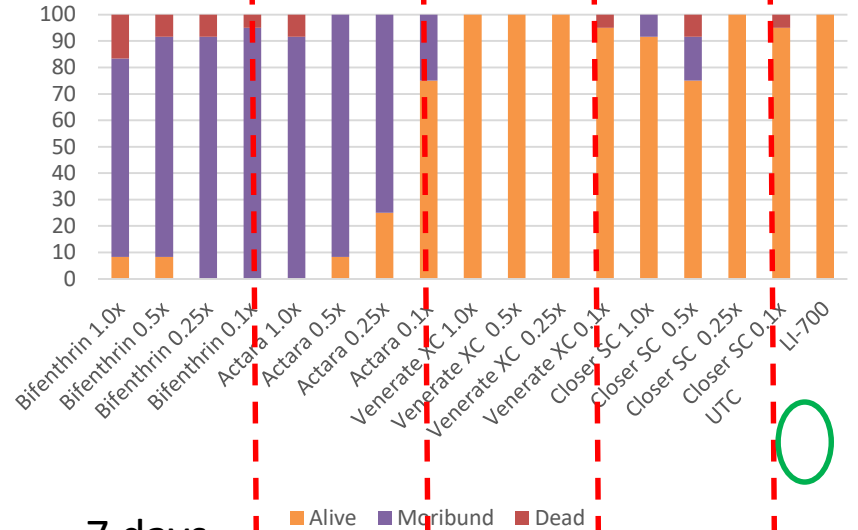
\* - significant at  $P \leq 0.05$  (ANOVA, Fisher's Protected LSD, sqrt transformation)

# BMSB adults topical bioassays

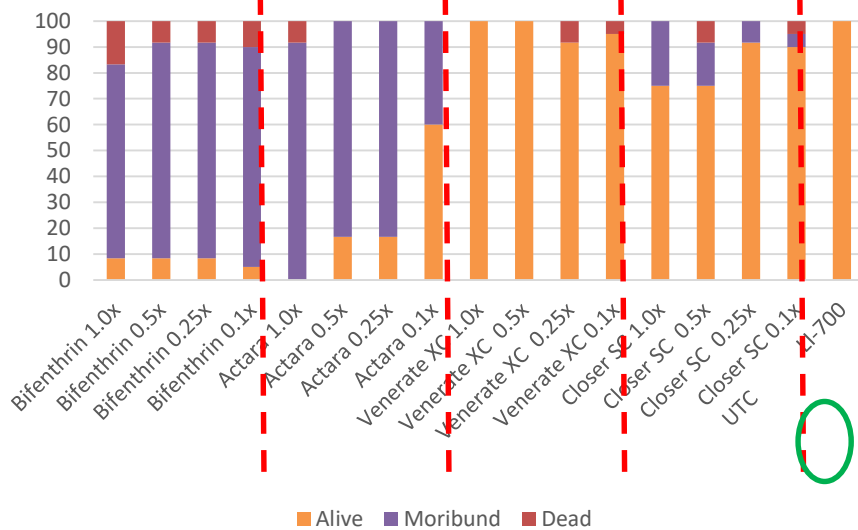
24 hours



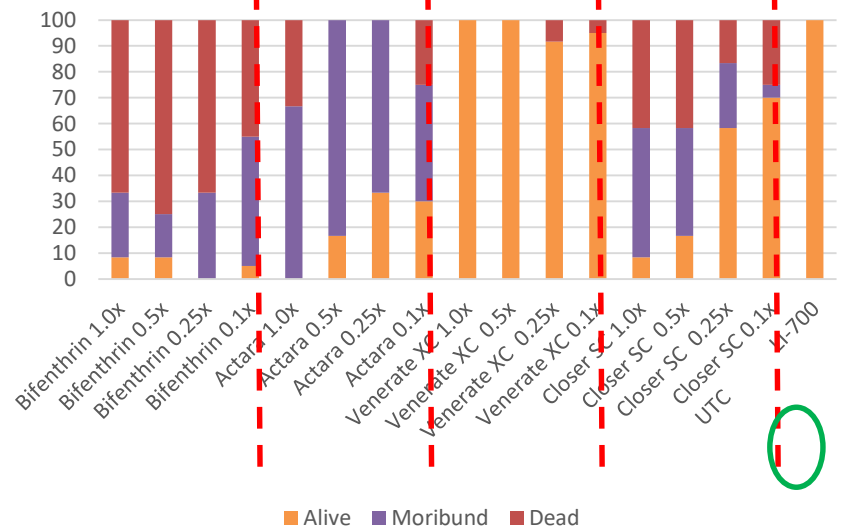
48 hours



72 hours



7 days



Alive Moribund Dead

Alive Moribund Dead



# Summary



Products recommended for the BMSB management such as Bifenture® or Actara® are effective against BMSB adults.



The differences in BMSB male and female responses to various products was not significant, although it appears to be size related



Three evaluated BMSB populations from OH, PA and VA responded similarly to tested products, while the NC population was less sensitive.



The “moribund” response of treated BMSB adults during a topical bioassay influenced the mortality readings in the laboratory bioassays, however it should be treated positively for the overall efficacy of the product during a field application.



# THANK YOU !

