Department of Entomology

Texas A&M AgriLife Extension

Crape myrtle bark scale efficacy trial
at LeTourneau University

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SUMMARY

Efficacy of a horticultural oil + insect growth regulator mix (SuffOil-X + Molt-X) and two imidacloprid formulations (Bayer Tree and Shrub; Fertilome Tree & Shrub Systemic Insect Drench) were tested for control of bark scale (*Eriococcus lagerostroemia*) on crapemyrtles at LeTourneau University. There was a trend towards decreasing alive scales and decreasing alive:dead scale ratio with time, especially by the fifth week in all treatments (including the control). The systemic insecticides (imidacloprid) demonstrated a decrease in alive:dead scale ratio two weeks after treatment, whereas contact treatments showed a decrease one week after treatment (horticultural oil + insect growth regulator). Since the control also showed decrease in scale populations, in some cases before other treatments, the efficacy of the insecticides studied here are inconclusive. Reasons for why there was a drop in scale populations in the control treatment are explained in the discussion.

OBJECTIVE

To determine the most effective control for crape myrtle bark scale between a horticultural oil (SuffOil-X) + insect growth regulator (Molt-X) mix, and imidacloprid (Bayer Tree and Shrub; Fertilome Tree & Shrub Systemic Insect Drench) on crapemyrtles.

DISCUSSION

Due to the decrease in scale populations in the control, drawing conclusions about the efficacy of the treatments will be challenging. A study by Dr. Mike Merchant (verbal communication, 2014) showed that crape myrtle bark scales undergo natural increases and decreases in population over a season; the reason for this is not yet explained. It is possible that the decrease in alive:dead ratio in the control is due to the natural declines in scale populations throughout a season. Later in the season (i.e. week 3 – 5), many natural predators, namely ladybeetles (*Scymnus spp.*, *Hyperaspis lateralis*, *Chilocorus cacti*, and *C. stigma*), were present in large numbers. Natural predators could have been a contributing factor to overall pest suppression in addition to treatment effects. Another reason why the control treatment dropped in scale population could have

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been an underestimation in the spray drift or the ability for the systemic to travel in the soil. However, **Figure 7** shows that even control trees that were far from treated trees (i.e. "E") had an unexplained drop in scale population; although such a drop could be explained by removal of early infestation by pruning of the branches (sampling method).

Future studies should take caution to ensure that there is no cross-contamination between treatments (i.e. larger space between trees, buffer trees between treatments). In order to reduce the potential affects of pruning on low scale populations, it may be beneficial to take less samples (i.e. once before treatment and 3 weeks after treatment) or use none-destructive assessments of tree infestation (i.e. visual inspection of infestation/aesthetics).

METHODS

A total of 22 trees at LeTourneau University, Longview (TX) (behind Thomas Hall) were reportedly infested with crape myrtle bark scale. They had varying degrees of infestation, which were categorized as being either "low" or "high", based on visual assessment (**Figure 1**). Trees with low infestation often required close inspection to find any scale, whereas high infested trees were easy to determine as infested from a distance.

High infested and low infested trees were split into two separate blocks, with four treatments (Control, SuffOil-X + Molt-X, Bayers Advanced Tree and Shrub, and Fertilome Tree & Shrub Systemic Insect Drench; **Figure 1**) applied at the label recommended rate. SuffOil-X at a rate of 1% v/v was tank mixed with Molt-X at a rate of 1% v/v and sprayed using a pump and hose for full contact coverage (**Figure 2).** Treatments were applied June 20th, 2014.

Data on alive and dead scale were recorded by pruning two branches from each tree, at least 18 inches in length and 1 inch thick, and counting scales under a microscope. The number of alive and dead crape myrtle bark scale were assessed for each branch, spanning at least 18 inches. Where the number of scales exceeded 100, the total number of scales was estimated by projecting the total number across 18 inches based on the distance counted (i.e. if 30 alive and 70 dead scale were counted within the first 2 inches, the estimated total across the 18 inches would be 18/2*30 = 270 alive and 18/2*70 = 630 dead). Scales were poked and where exudate was present, the scale was determined to be alive. If exudate was pasty, non-existent, or the scale was dried, they were counted as "dead". Egg clusters that were pink inside were marked alive, whereas egg clusters with no color inside were not counted, as the lack of pink inside could mean death or hatched eggs. Empty male pupae were not counted, but pupa with dry/pasty males inside were counted dead, and males that had exudate upon poking were counted alive. Scale counts began June 18th (2014), then every week for a total of five weeks.

Number of replicates analyzed for alive:dead ratio varied for total (**Table 1**), high infested (**Table 2**) and low infested (**Table 3**) trees due to absence of any crape myrtle bark scale on some branch samples. One 'fake dead scale' was added to all data, to prevent division by 0 for alive:dead ratios.

RESULTS

There was an overall trend towards a decrease in the number of alive crape myrtle bark scale with time (**Figure 3**), including the control, for trees that had an initial high infestation. Trees that had an initial low infestation showed a similar overall trend, except Fertilome treated trees showed an increase in scales on the second week, followed by a drop in alive scales (**Figure 4**). Alive:dead ratio for both high and low infested crapemyrtles (pooled data) showed a drop in scale population by the third week for Bayer, fourth week in the control, fifth week for SuffOil-X + Molt-X, and fourth week for Fertilome (**Figure 5**). The initially highly infested trees showed a decreasing trend in scale alive:dead ratio in the Fertilome, Bayer and control treatments between the first and third week (**Figure 6**). SuffOil-X + Molt-X dropped in alive:dead ratio by the second week (**Figure 6**). In order to determine whether the drop in control group scale populations was due to contamination (i.e. drift or systemic reaching the controls), the alive:dead ratio of individual trees was visually analyzed. Tree "E" was far from the other treatments (**Figure 1**), making contamination an unlikely explanation for its population crash after week 3. Tree "G" was not too far from a Fertilome treatment, however it experienced an increase in alive:dead ratio on week 3 and then a crash on week four. Trees "N" and "P" were close to SuffOil-X + Molt-X spray and experienced lower alive:dead scale by week two and three.

Acknowledgements

LeTourneau University groundskeeper Scott Hembrough, for the collaboration and Laura McKinstry for applying the pesticide treatments. LeTourneau University Associate Professor of Biology, Dr. Andrée Elliott, for letting us use their dissecting microscopes, lab space for the scale counts and Cara Case for lending assistance. Last but not least, the Longview Master Gardeners: Pete Quinn, Marie Kerr, Jo Jones, Dorothy Smith, BJ Clark, Karen Moser, Debbie Hackley, Phyllis Leath and Judy Thomas for their hard work and perseverance in counting the scales.

Table 1. Total replicates per treatment (high and low infested trees combined) per week.

	Number of replicates per week (1 = pre-treatment)				
	1	2	3	4	5
Control	6	6	7	6	7
SuffOil-X + Molt-X	7	7	7	7	7
Fertilome	5	5	5	5	5
Bayer	3	3	3	3	3

Table 2. Total replicates per treatment in high infested trees per week.

	Number of replicates per week (1 = pre-treatment)				
	1	2	3	4	5
Control	3	3	3	3	3
SuffOil-X + Molt-X	3	3	3	3	3
Fertilome	3	3	3	3	3
Bayer	2	2	2	2	2

Table 3. Total replicates per treatment in low infested trees per week.

	Number of replicates per week (1 = pre-treatment)				
	1	2	3	4	5
Control	3	3	4	3	4
SuffOil-X + Molt-X	4	4	4	4	4
Fertilome	2	2	2	2	2
Bayer	1	1	1	1	1

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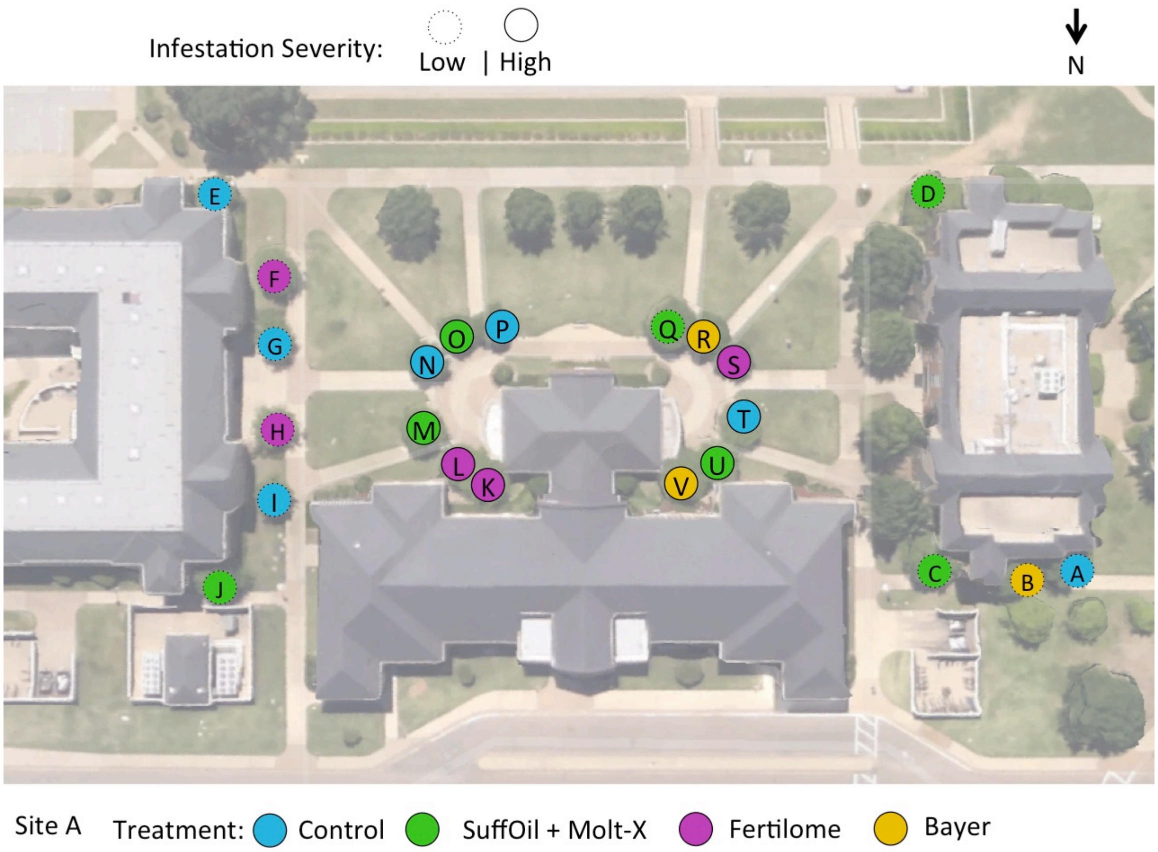

Figure 1. Each circle represents a crapemyrtle tree infested with crape myrtle bark scale (LeTourneau University, Longview, TX). Trees with initial low infestation are denoted with dotted lines and high infestation with solid lines. Colors denote different treatments, administered two days after first crape myrtle bark scale count.

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Figure 2. Spray rig used for SuffOil-X + Molt-X tank mix. Large garbage page was used for holding the mixed insecticide solution. Pump and hose were used for the delivery system.

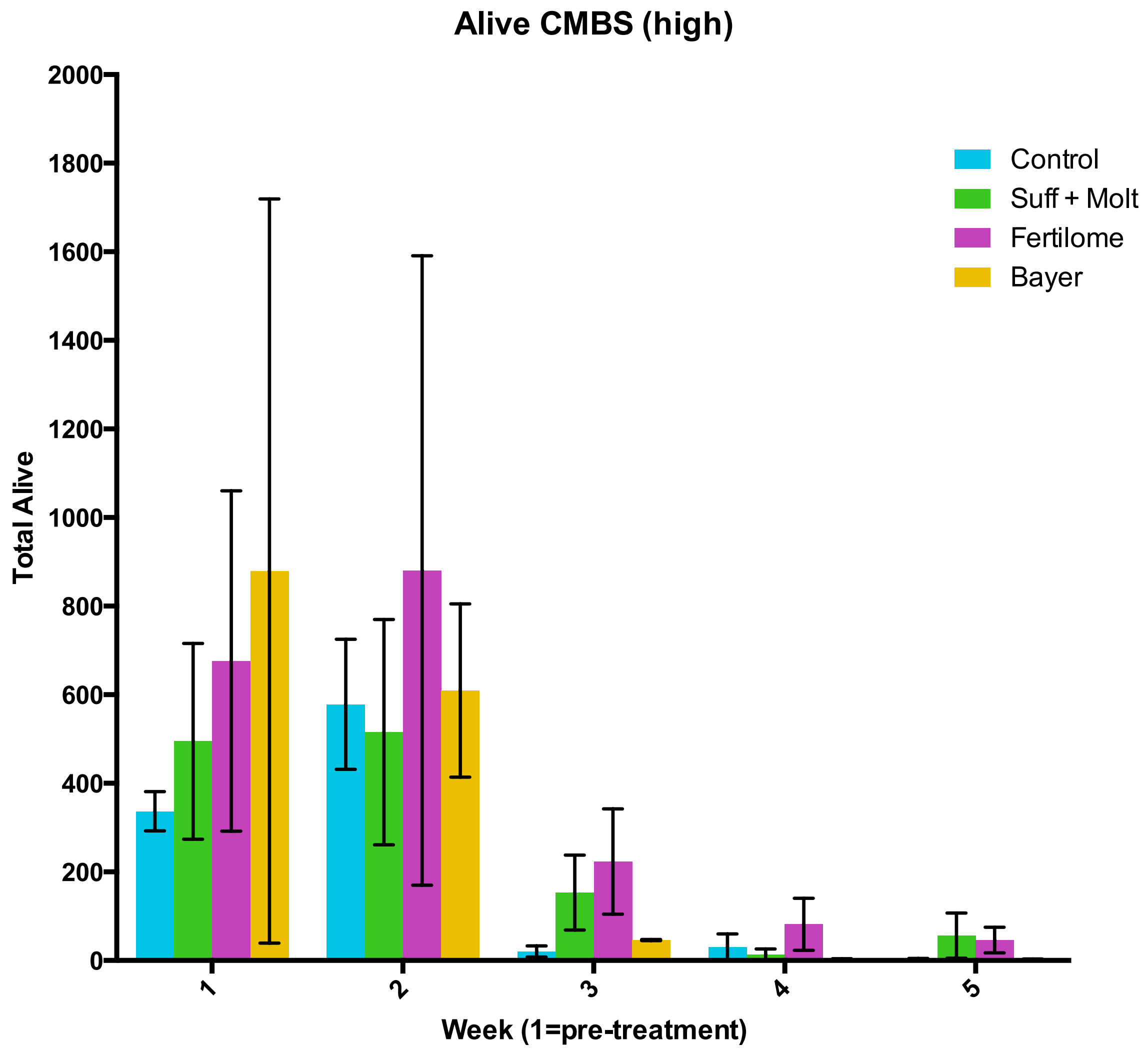

Figure 3. Mean (± SE) of total alive crape myrtle bark scale (CMBS) across 18 inches of branch before (1) and four weeks after (2-5) treatment with SuffOil-X+Molt-X, Fertilome, or Bayer on trees with initial high infestation.

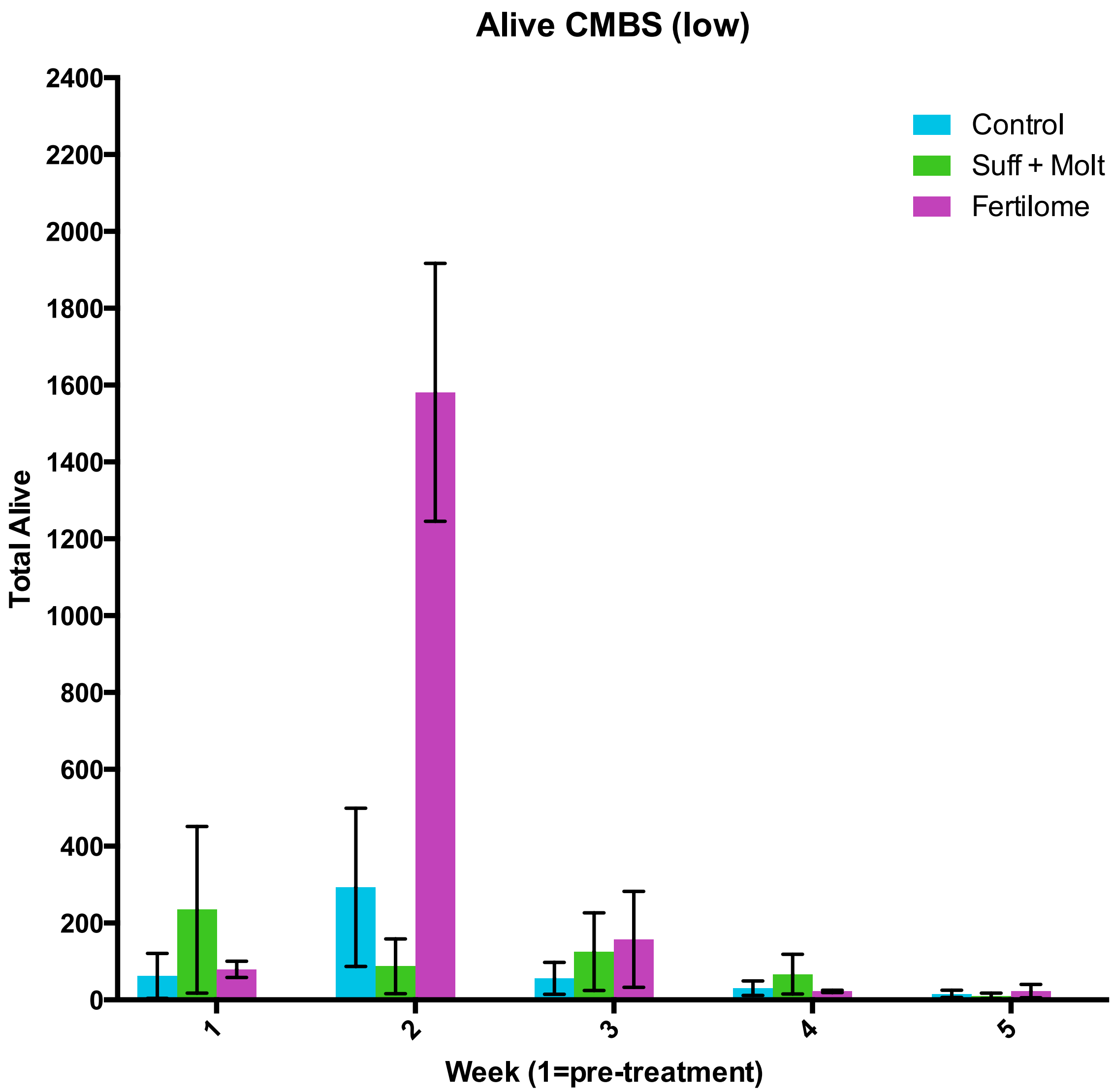

Figure 4. Mean (± SE) of total alive crape myrtle bark scale (CMBS) (± SE) across 18 inches of branch before (1) and four weeks after (2-5) treatment with SuffOil-X+Molt-X or Fertilome on trees with initial low infestation. Bayer removed from this graph due to lack of replicates.

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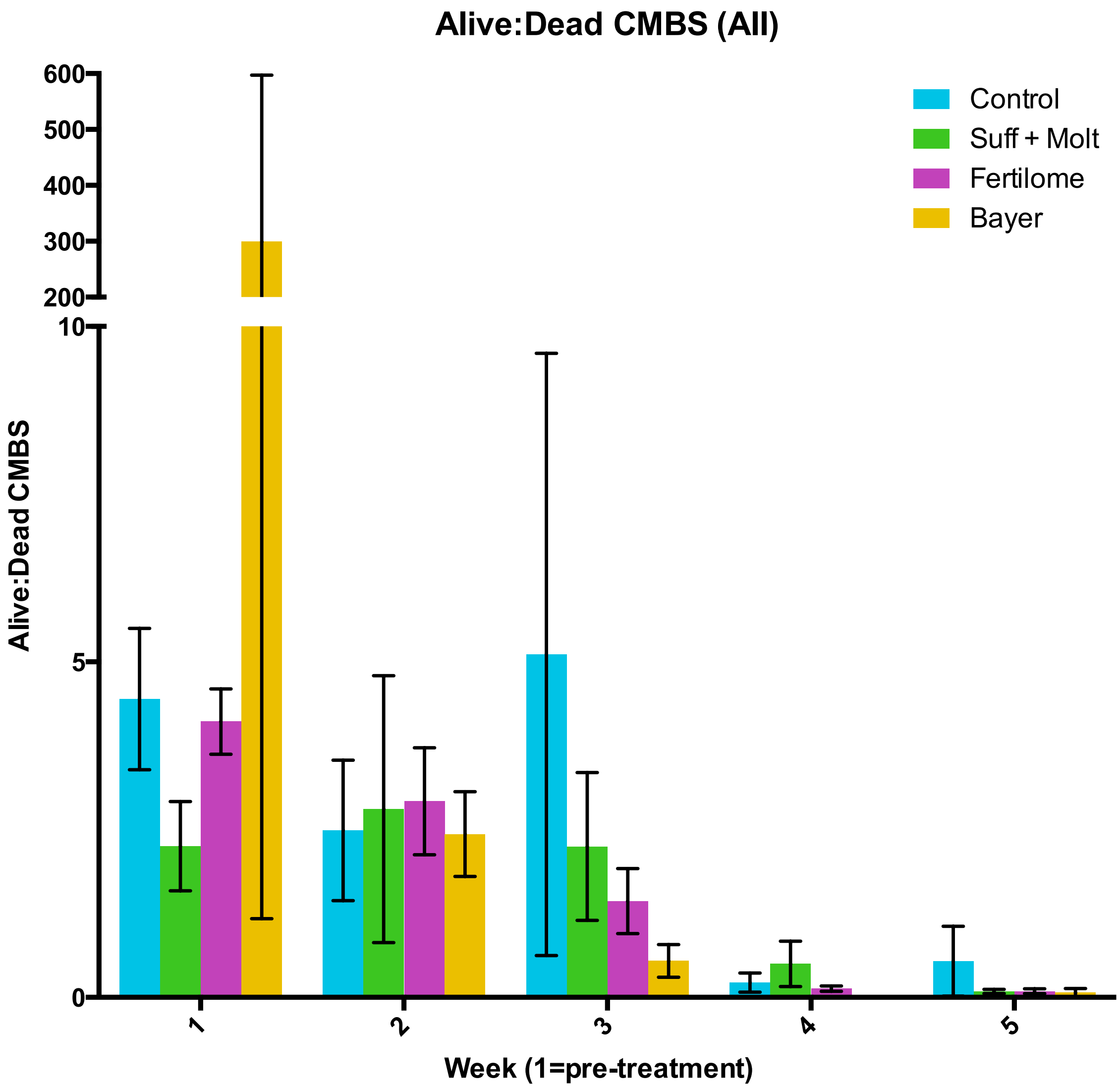

Figure 5. Mean (± SE) alive:dead ratio of crape myrtle barkscale (CMBS) before (week 1) and 4 weeks after (2-5) treatment. Note very large variation in week 4 for Bayer, with the y-axis scale also being different on top than below.

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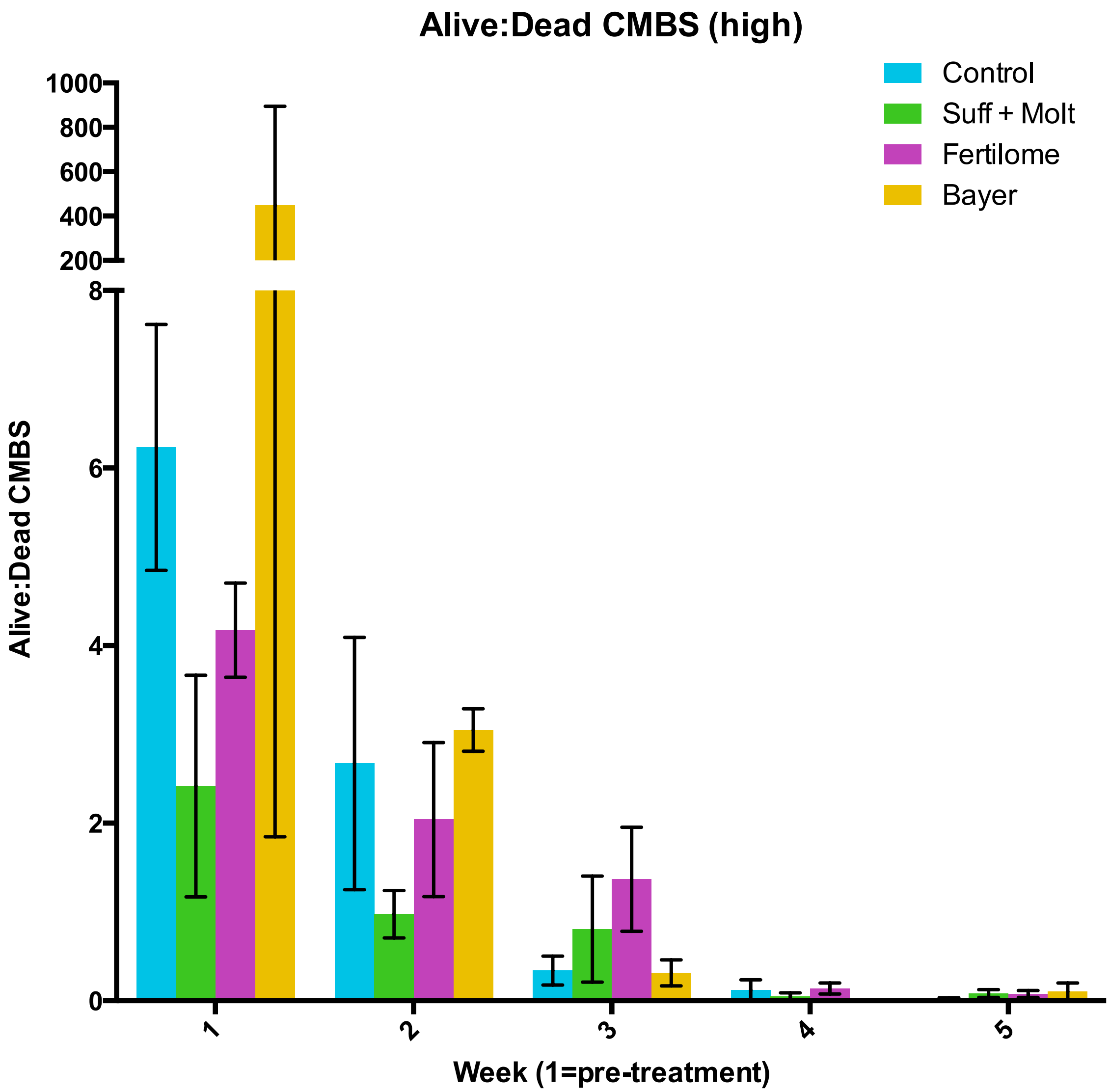

Figure 6. Mean (± SE) alive:dead ratio of crape myrtle bark scale (CMBS) before (week 1) and four weeks after (2-5) treatment application. Bayer data for week four was removed, due to very large alive:dead ratio and standard error (mean (± SE)= 82.0 ± 82.0, n=2).

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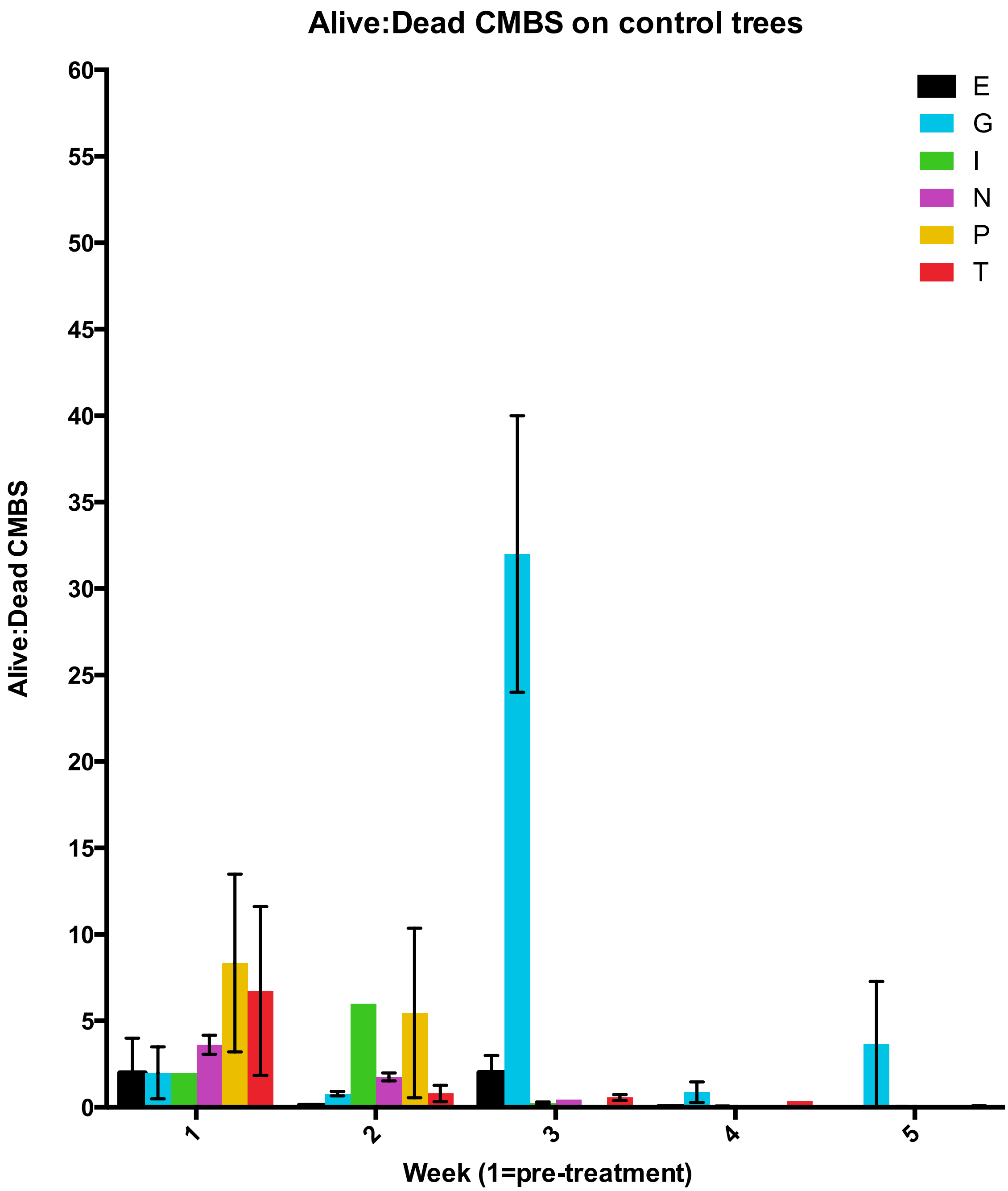

Figure 7. Mean (± SE) alive:dead ratio of crape myrtle bark scale (CMBS) on control trees only from week 1 to 5.

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