Impact of Selected Insecticides on Cotton Fleahopper Infesting Late-Planted Cotton

Evaluated at the Cotton Growers Research & Demonstration Farm in Wall, TX (Tom Green County). Cotton seed (Phytogen 332W3FE) was planted on 12 June 2025. Plot size was four rows (40 in centers) by 40 feet. Treatments were replicated four times in an RCBD. Foliar insecticide treatments were applied using a high-clearance sprayer (Lee Agra Spider) with a compressed air spray system calibrated to deliver 10 GPA through TeeJet 02 flat-fan nozzles (2/row) on 31JUL25 (application 1) and 17AUG25 (application 2). Treatment efficacy was determined by end of season plot-yield and sampling one of the center two rows of each plot with a modified leaf-vacuum (Ryobi 40V VAC Cordless Leaf Vacuum), 20 plants per plot at 3, 7, and 14 days after treatment one (DAT1) and 3 and 10 days after treatment 2 (DAT2). Rainfall of 0.33 in. occurred between the first application and the end of sampling. Data were subjected to Two-Way ANOVA, Multiple Paired *t*-Test, and means separated according to Tukey's Honest Significant Difference with a $P = 0.05$.

Based on the results of ordinary One-Way ANOVA (Table 1), fleahopper counts showed no significant treatment differences at 3 DAT1 ($F=0.72$, $P=0.64$), 7 DAT1 ($F=0.76$, $P=0.61$), or 14 DAT1 ($F=0.59$, $p=0.74$). However, there were significant differences between fleahopper counts at 3 DAT2 ($F=8.22$, $p<0.001$) and 10 DAT2 ($F=7.13$, $p<0.001$). Based on the results of ordinary One-Way ANOVA (Table 2) of bulk data, the mean number of fleahoppers statistically decreased across all time points ($P<0.0006$), and there were no statistical differences between the mean number of fleahoppers per treatment across all time points ($P=0.1286$). Results of Two-Way ANOVA on fleahopper counts at each time point for each pesticide treatment resulted in significant differences in the mean number of fleahoppers after treatment spray number 2 (Table 2). Products such as Brigade, Verteno (formerly Plinazolin), Admire Pro & Acephate reduced fleahopper populations to numbers statistically lower than the non-treated at 14 DAT1 and 3 DAT2 (Tables 1 & 2). Pesticide treatments did not statistically affect total yield compared to the non-treated control, although Vertento at 2 oz resulted in slightly better total yield than the other treatments based on Tukey's pairwise comparisons (table 2) and rank ratios. Since the yield in the non-treated control was not significantly different than the pesticide treatments, rank ratios were used to score each treatment as the poorest or best option based on the lbs. of seed cotton produced per the reduced number of fleahoppers (table 2). Results of multiple paired t-tests of cumulative fleahoppers and yield revealed that the non-treated control was not statistically significant compared to the pesticide treatments.

Table 1. Treatment means with results of 1-way ANOVA and Tukey's test for the number of fleahoppers per 20 plants at each time point.

Treatment/Form.	Rate/acre (oz[a] form.)	Mean (Adults + Nymphs) Cotton Fleahopper /20 plants 3 DAT1	7 DAT1	14 DAT1	3 DAT2	10 DAT2
Untreated Control		2.00	4.50	4.75	3.50a	4.50a
Sivanto Prime 17.09% SL	7.00	0.75	2.25	2.25	2.00a	2.50a
Mustang Maxx 0.8 lb AI/gal EC	3.50	0.75	2.75	3.25	0.25b	0.75b
Brigade 2EC	3.00	0.50	3.50	3.75	0.00b	1.75b
Vertento 400SC	1.54	1.25	4.50	2.25	0.00b	2.75a
Vertento 400SC	2	1.00	2.50	3.00	0.00b	2.00b
Admire Pro 4.6 lb AI/gal SL + Acephate 90% SP	2, 4	1.75	2.50	3.00	0.00b	0.25b
P- value		0.6364	0.6101	0.7381	0.0001	0.0003

Values within columns followed by a common letter are not significantly different (P ≤ 0.05, TUKEY).

[a] oz wt. / acre.

Table 2. Treatment means and results of ANOVAs and Tukey's test for the number of fleahoppers per 20 plants at each time point.

Treatment/Form.	Rate/acre (oz[a] form.)	Mean (Adults + Nymphs) Cotton Fleahopper /20 plants[b] 3 DAT1	7 DAT1	14 DAT1	3DAT2	10 DAT2	Mean (Adults + Nymphs) Cotton Fleahopper[c]
Untreated Control		2.25 ab	4.5 ab	4.75 a	3.5 ab	4.5 ab	3.8
Sivanto Prime 17.09% SL	7.00	0.75 ab	2.25 ab	2.25 ab	2 ab	2.5 ab	1.95
Mustang Maxx 0.8 lb AI/gal EC	3.50	0.75 ab	2.75 ab	3.25 ab	0.25 ab	0.75 ab	1.55
Brigade 2EC	3.00	0.5 ab	3.5 ab	3.75 ab	0 b	1.75 ab	1.9
Vertento 400SC	1.54	1.25 ab	2.5 ab	2.25 ab	0 b	2.75 ab	2.15
Vertento 400SC	2	1 ab	2.5 ab	3 ab	0 b	2 ab	1.7
Admire Pro 4.6 lb AI/gal SL + Acephate 90% SP	2, 4	1.75 ab	2.5 ab	3 ab	0 b	0.25 ab	1.5
All Treatments		1.14 a	3.21 a	3.17 ab	0.82 b	2.07 b	

[a] oz wt. / acre.

[b] *P* value (2wayANOVA, *P* ≤ 0.05): Interaction = 0.7552; Pesticide = 0.0001; Time = <0.0001.

[c] *P* value (1wayANOVA, *P* ≤ 0.05) = <0.1286; F =1.833; r^2 =0.2821.

[d] *P* value (1wayANOVA, $P \leq 0.05$) = <0.0006; F =6.647; r^2 =0.4699. Values within this row followed by a common letter are not significantly different ($P \leq 0.05$, TUKEY).

Table 3: Results of 1-way ANOVA and multiple paired t-test of cumulative fleahoppers and total plot yield.

Treatment/Form.	Rate/acre (oz[a] form.)	Cumulative Fleahoppers (Adults + Nymphs) and Total Yield[c]			
		Number of fleahoppers	Lbs. of seed lint	*P* value (paired t-test)	Rank Ratio[b]
Untreated Control		77	80.3	0.865760	1.264[7] a
Sivanto Prime 17.09% SL	7.00	39	75.4	0.025973	1.993[5] ab
Mustang Maxx 0.8 lb AI/gal EC	3.50	31	79.9	0.006856	3.002[2] b
Brigade 2EC	3.00	38	80.4	0.010227	2.402[4] ab
Vertento 400SC	1.54	43	76.9	0.003536	1.841[6] ab
Vertento 400SC	2	34	86	0.026278	2.893[3] ab
Admire Pro 4.6 lb AI/gal SL + Acephate 90% SP	2, 4	30	80.1	0.012467	6.478[1] b
P-value 1way ANOVA		0.0536	0.8532		0.0339

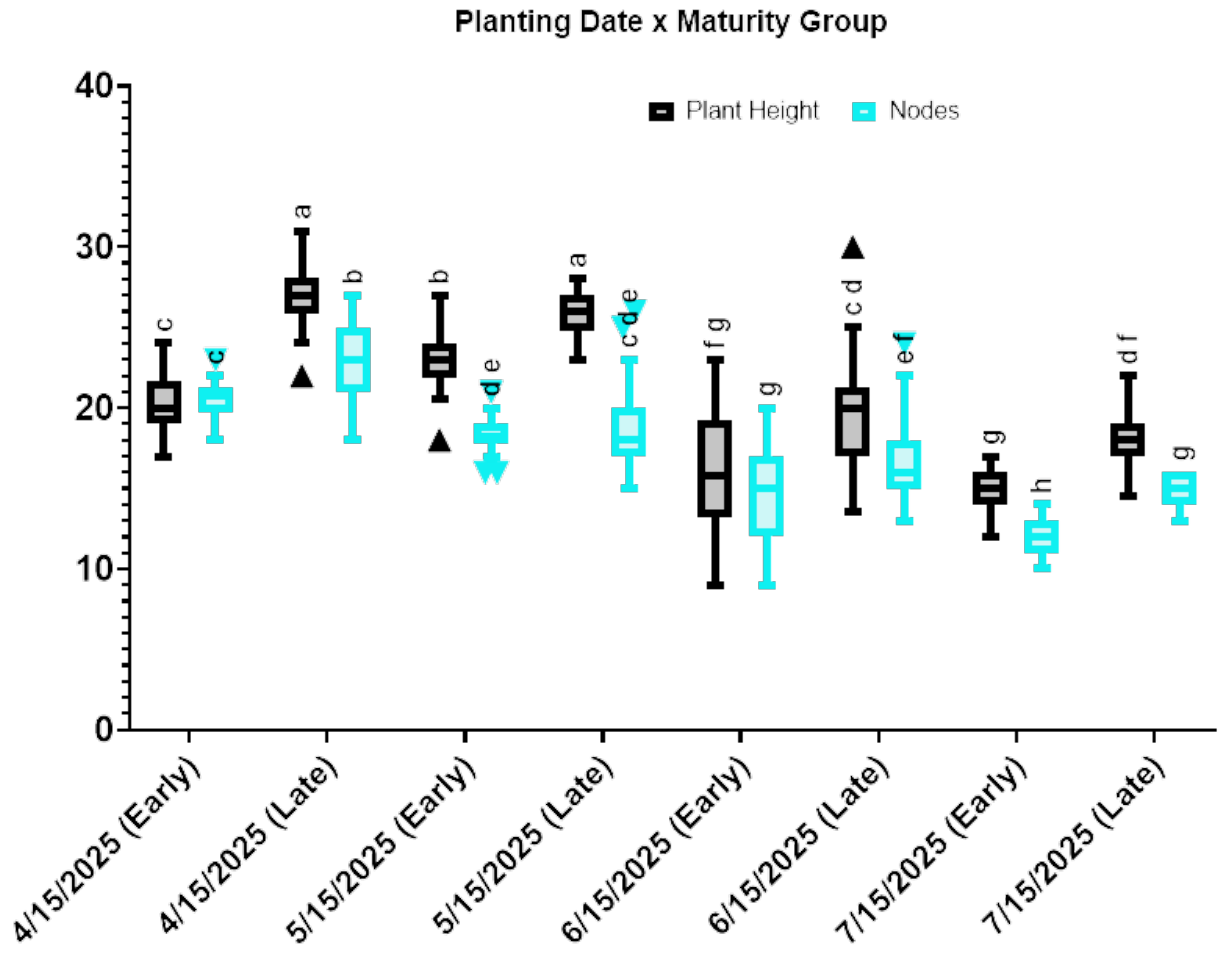
Values within columns followed by a common letter are not significantly different ($P \leq 0.05$, TUKEY).

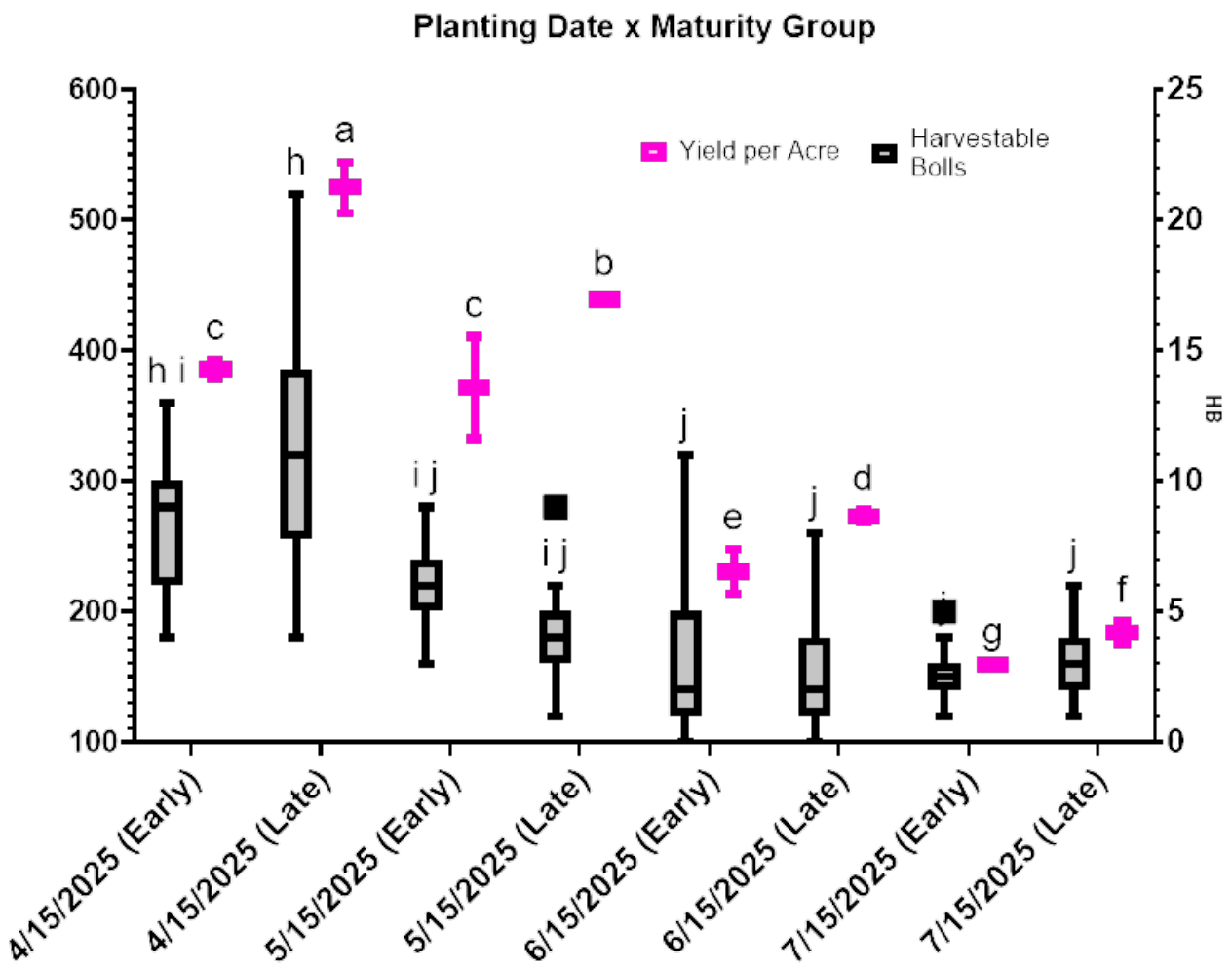
[a]oz wt. / acre.

[b]Ranked calculated ratios of seed lint to cumulative fleahoppers, ranked in order of highest ratio to lowest ratio.

Impact of Planting Date on Cotton Development and Yield

Phytogen 200 (Early) & Phytogen 440 (Late) were planted ~42k plants per acre on April 15, May 15, June 15, July 15 in 215-foot 4 row strips (x 3) and into two irrigation blocks (April / May & June / July). Results of 2-way ANOVA and Tukey's HSD test (common letters above graphs are not significantly different).




Planting Date x Maturity Group
Yield per Acre
Harvestable Bolls
HB
600
500
400
300
200
100
25
20
15
10
5
0
h i
c
h
a
i j
c
i j
b
j
e
j
d
i
g
j
f
4/15/2025 (Early)
4/15/2025 (Late)
5/15/2025 (Early)
5/15/2025 (Late)
6/15/2025 (Early)
6/15/2025 (Late)
7/15/2025 (Early)
7/15/2025 (Late)