IMPACT OF PRE-BLOOM SQAURE LOSS ON YIELD AND LINT QAULITY IN LOUISIANA COTTON CROPPING SYSTEMS

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Abstract

During the 2016 growing season, research was conducted at three locations in the state of Louisiana to evaluate the impact of pre-bloom square loss on cotton lint yield and fiber quality. Two cotton varieties, Phytogen 499WRFand Phytogen 222WRF were chosen to imitate early season square loss due to tarnished plant bug (*Lygus lineolaris*) feeding or unfavorable weather conditions. Thirty plants within each plot were selected and squares were counted. Squares were assigned numbers, and numbers were then randomized using a computerized number generator. To simulate intervals of minimum to maximum fruit loss, just prior to bloom, squares were removed at 0, 20, 40, 60, 80, and 100%. Throughout the growing season, weekly applications of insecticide were sprayed to keep plants insect free to avoid unwanted damage. At the end of the season, ten plants within the thirty plants previously chosen were plant mapped and each plot was hand harvested for lint yield and fiber quality. The impact of square loss (removal) on yield and lint quality was highly variable depending on location and variety. Under certain conditions in the Mid-South, high levels of pre-bloom square loss cannot be tolerated. In these situations, lint yield can be reduced when pre-bloom square retention is less than 70%.

Introduction

Fruit loss in cotton can occur following stresses such as lack of sunlight, water deficiencies, and insect damage (Jones, 1996). Each of these variables can cause extensive injury to cotton plants throughout the growing season. Depending on the growth stage in which injury occurs, the plant may or may not be able to overcome and/or compensate for that injury. Compensation for lost fruit or plant injury can be dependent on many factors such as soil fertilization, age of fruit, cotton cultivars, density of planting, planting date fluctuations, amount of fruiting branches, and severity of injury (Stewart et al., 2001 and Bi et al., 1991). Kerns et al. (2015) conducted a study within the Texas high plains on cotton's capability of compensating for pre-bloom square loss due to weather, such as hail damage, and square feeding insects, such as the cotton fleahopper. They concluded that these factors have little or no influence on yield. Although the outcome of this research indicates little to no yield loss in that particular region, other regions, such as the Mid-South, may display different results from the same experiment. With this information in mind, research must be performed in other geographical areas to discover whether or not the same outcomes will occur with different variables affecting plant growth during the growing season.

Materials/Methods

Cotton compensation trials were planted in three different locations within Louisiana: Macon Ridge Research Station (Winnsboro, La.), Northeast Research Station (St. Joseph, La.), Dean Lee Research Station (Alexandria, La.). The two cotton varieties used in this trial were Phytogen 499WRF and Phytogen 222WRF. Six levels of square removal (0%, 20%, 40%, 60%, 80%, and 100%) were used to simulate intervals of minimum to maximum square removal due to insect pests or climatic stresses that may occur during a growing season. The experimental design used was a 2x6 factorial (2 varieties x 6 levels of square removal) with 4 replications. Plot sizes consisted of 4 rows by 40 feet in length. In each plot, a sub-plot was created, which consisted of one 14 foot row or 1/1000th of an acre that was designated as the research area for square removal and data collection. Each sub-plot was thinned to 30 healthy and intact plants at approximately the 5 true leaf stage. Within each sub-plot, squares were counted and each square assigned a number. From these numbers, the percentage of squares to be removed were randomly assigned. Designated square removal took place when cotton plants reached 12-14 nodes (just prior to

bloom) and was accomplished using fine nosed forceps. After squares were removed, insect pests were controlled on a weekly basis. Mepiquat chloride applications for height control were made throughout the season. Nodes above white flower were recorded on 10 plants, 14 days prior to defoliation. Just before harvest, 10 plants/plot were plant mapped to determine if and where fruit compensation occurred. Linear and non-linear regressions using GraphPad Prism version 7.00 (2016), Sigma Plot version 13, and Sysstat Software (2014) was used to statistically analyze the information shown below. Plots were hand harvested and seed cotton was ginned at the Dean Lee Research Station to determine lint yield and gin turnout. Fiber samples were sent to the LSU cotton fiber laboratory for HVI analysis.

Results

Dean Lee Research Station (Alexandria, Louisiana)

At the Alexandria location, there was no evidence of a variety × square removal interaction for yield, therefore varieties were pooled. Yields varied across square removal treatments, but the 0, 20, and 40% square removal treatments yielded significantly higher when compared to the 100% square removal treatment (Table 1).

Table 1. Mean ± SEM of yield across varieties subjected to various degrees of pre-bloom square removal for two cotton varieties at Alexandria, LA.

Percentage of squares removed	Yield (lint lbs./acre)
0	1105.11 ± 77.03ab
20	1164.53 ± 77.04a
40	1156.95 ± 51.43ab
60	1070.97 ± 55.18abc
80	899.62 ± 29.44bc
100	818.91 ± 47.01c
Variety × square removal interaction	$p = 0.4515$

Means in a column within variety or percentage of squares removed followed by the same letter are not significantly different based on an F-protected Tukey's HSD Test ($p \geq .05$).

PHY 499WRF demonstrated the ability to compensate or overcompensate for square loss. Based on a curvilinear regression, yield tended to increase from 0% to 20% square removal and then declined, which suggests some overcompensation (Figure 1).

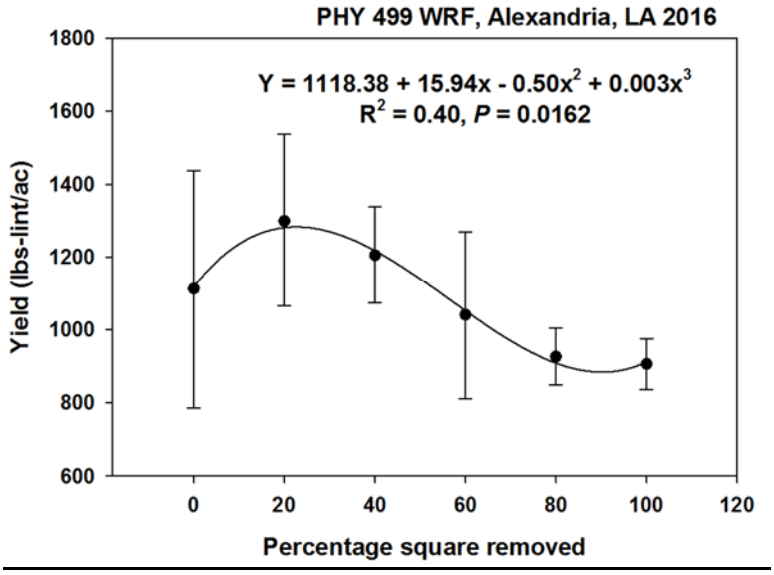

Figure 1. PHY 499WRF yield as influenced by pre-bloom square removal. F (3, 20) = 4.36.

PHY 222WRF at the Alexandria location produced yields that remained relatively flat until 60% square loss, which suggests significant compensation up to 60% pre-bloom square loss (Figure 2). Following the 60% square loss treatment, yields began to decrease, which provides evidence that PHY 222WRF was not able to compensate for more than 60% pre-bloom square loss.

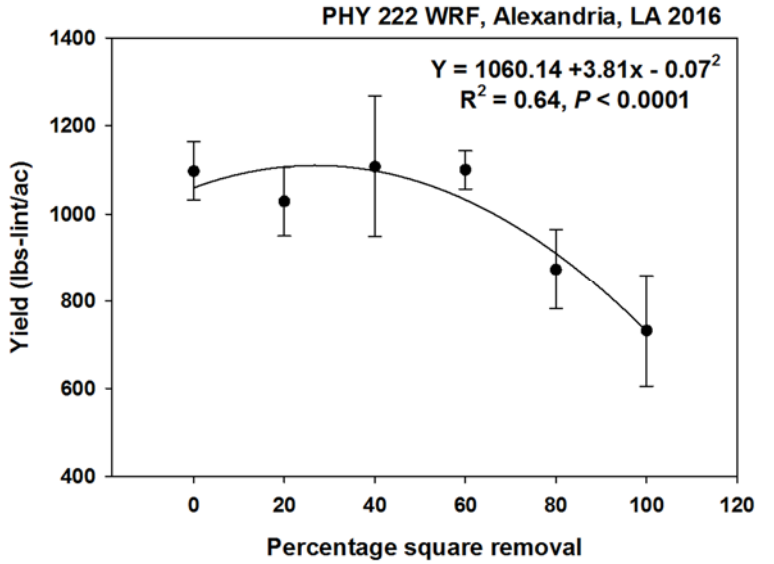

Figure 2. PHY 222WRF yield as influenced by pre-bloom square removal. F (2, 21) = 18.36.

There was no variety by square removal interaction present for percentage of open bolls per plot by lateral branch position, therefore varieties were pooled (Table 2). At the 1st position, the % open bolls for the 0% square removal treatment was significantly higher than the 40, 60, 80, and 100% treatments. This provides evidence that a significant amount of square removal took place at the 1st position because squares were removed at approximately 12-14 nodes, when 1st position fruit is more prevalent than 2nd and 3rd position fruit. The second position showed

no statistical differences, but at the third position the 0% square removal treatment had significantly less open bolls when compared to the 60, 80, and 100% square removal treatments, which suggests a higher retention rate on the 3rd position at 60-100% pre-bloom square removal.

Table 2. Mean ± SEM percentages of open bolls per plot by lateral branch positions across varieties subjected to various degrees of pre-bloom square removal for two cotton varieties at Alexandria, LA.

	Percentage of open bolls		
Percentage of squares removed	1st position	2nd position	3rd+ position
0	55.58 ± 1.61a	31.65 ± 1.37a	12.77 ± 1.73b
20	47.91 ± 1.31ab	31.45 ± 1.86a	20.64 ± 1.95ab
40	45.53 ± 2.21b	32.79 ± 1.26a	21.68 ± 1.91ab
60	39.80 ± 3.53b	35.17 ± 2.67a	25.03 ± 2.14a
80	39.65 ± 2.46b	30.08 ± 1.99a	30.27 ± 3.43a
100	40.46 ± 3.47b	30.05 ± 2.18a	29.49 ± 2.60a
Variety × square removal interaction	$p = 0.0849$	$p = 0.7304$	$p = 0.6184$

Means in a column within variety or percentage of squares removed followed by the same letter are not significantly different based on an F-protected Tukey's HSD Test ($p \geq 0.05$).

There was no variety × square removal interaction, but differences were identified when comparing the distribution of bolls among the square removal treatments within the top 9+ and bottom 1-8 nodes of the plants when varieties were pooled (Table 3). The 0 and 20% square removal treatments had significantly less open bolls on the upper portion of the plant when compared to the 80 and 100% treatments. This does not necessarily suggest compensation on the upper portion of the plant, instead it reflects the removal of squares just prior to bloom, when plants reached approximately 12-14 nodes.

Table 3. Mean ± SEM percentages of open bolls per plot by vertical node position across varieties subjected to various degrees of pre-bloom square removal for two cotton varieties at Alexandria, LA.

	Percentage of open bolls	
Percentage of squares removed	Top 9+	Bottom 1-8
0	72.55 ± 3.47c	27.45 ± 3.47a
20	75.22 ± 2.22c	24.78 ± 2.22a
40	82.02 ± 2.35bc	17.98 ± 2.35ab
60	78.28 ± 2.94bc	21.72 ± 2.94ab
80	87.56 ± 1.61ab	12.44 ± 1.61bc
100	92.47 ± 1.29a	7.53 ± 1.29c
Variety × square removal interaction	$p = 0.7261$	

Means in a column within variety or percentage of squares removed followed by the same letter are not significantly different based on an F-protected Tukey's HSD Test ($p \geq 0.05$).

There were no differences in percentage of vegetative and reproductive fruit when varieties were pooled, but there was a variety × square removal interaction ($p = 0.017$) (Table 4).

Table 4. Mean ± SEM percentages of open bolls per plot by vegetative and reproductive branches across varieties subjected to various degrees of pre-bloom square removal for two cotton varieties at Alexandria, LA.

	Percentage of open bolls[1]	
Percentage of squares removed	Vegetative%	Reproductive%
0	4.88 ± 1.58	95.12 ± 1.58
20	6.60 ± 2.27	93.40 ± 2.27
40	6.40 ± 1.31	93.60 ± 1.31
60	7.50 ± 1.52	92.50 ± 1.52
80	9.79 ± 2.12	90.21 ± 2.12
100	9.39 ± 2.83	90.61 ± 2.83
Variety × square removal interaction	$p = 0.017$	

[1]See figures 3 and 4 for the significant variety × square removal interaction for percentage open bolls on vegetative and reproductive branches.

Phytogen 499WRF had a significantly higher percentage of vegetative branch bolls when 80 and 100% of squares were removed (Figure 3) and a lower percentage of reproductive branch bolls (Figure 4). This suggests that full season varieties such as PHY 499WRF may compensate for high square loss (80-100%) by producing a higher percentage of fruit on vegetative branches, while short season varieties may lack this capability.

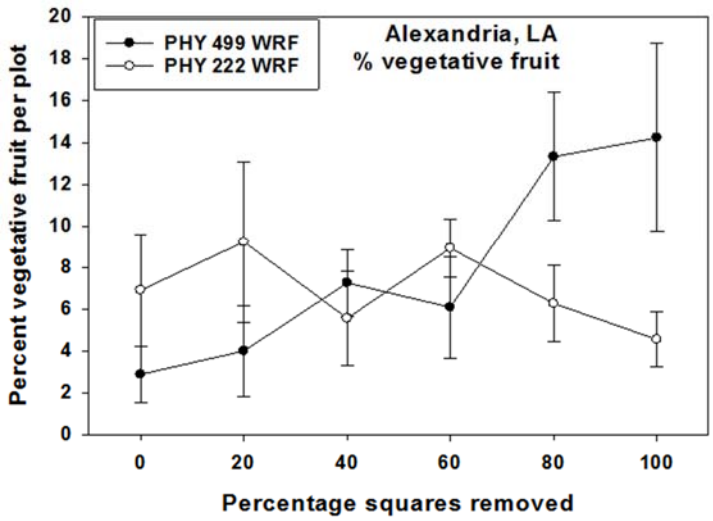

Figure 3. PHY 499WRF and PHY 222WRF percent vegetative fruit

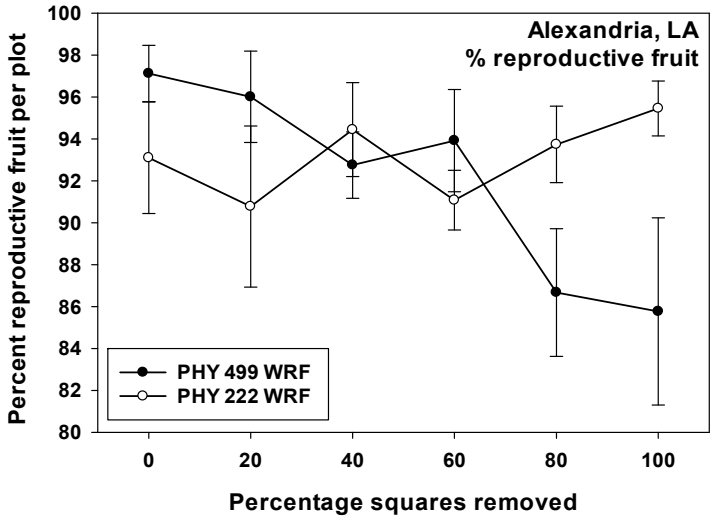

Figure 4. PHY 499WRF and PHY 222WRF percent reproductive fruit.

Statistical differences in fiber quality characteristics were not evident at different levels of square removal, but there was a significant variety × square removal interaction for micronaire ($p = 0.0002$) and uniformity ($p = 0.0312$) (Table 5).

Table 5. Mean ± SEM of fiber quality characteristics across varieties subjected to various degrees of pre-bloom square removal for two cotton varieties at Alexandria, LA.

	Fiber Quality Characteristics					
Percentage of squares removed	Gin out (percent)	Length (inches)	Uniformity[1] (percent)	Strength (grams/tex)	MIC[2]	Loan Value (cents/lb.)
0	40.79 ±0.62a	1.19 ± 0.01a	86.2 ± 0.22	31.4 ± 0.61a	4.1 ± 0.07	53.54 ± 0.01a
20	40.47 ± 0.80a	1.19 ± 0.01a	86.4 ± 0.21	32.3 ± 0.74a	4.1 ± 0.12	53.56 ± 0.01a
40	41.60 ± 0.94a	1.19 ± 0.01a	85.9 ± 0.32	32.0 ± 0.57a	4.1 ± 0.08	53.55 ± 0.01a
60	40.61 ± 0.53a	1.20 ± 0.01a	86.2 ± 0.15	32.1 ± 0.47a	4.1 ± 0.09	53.56 ± 0.01a
80	39.92 ± 0.51a	1.19 ± 0.01a	85.9 ± 0.46	32.4 ± 0.69a	4.1 ± 0.16	53.56 ± 0.02a
100	40.23 ± 0.79a	1.18 ± 0.01a	85.6 ± 0.26	32.0 ± 0.43a	4.0 ± 0.16	53.55 ± 0.01a
Variety × square removal interaction	$p = 0.26$	$p = 0.68$	$p = 0.0312$	$p = 0.65$	$p = 0.0002$	$p = 0.39$

Means in a column within variety or percentage of squares removed followed by the same letter are not significantly different based on an F-protected Tukey's HSD Test ($p \geq 0.05$).
[1]See figure 6 for the significant the variety × square removal interaction for percent uniformity
[2]See figure 5 for significant the variety × square removal interaction for MIC.

Phytogen 499WRF tended to have higher micronaire values as square removal increased, while the micronaire for PHY 222WRF tended to decrease with increasing square removal (Figure 5). Higher micronaire is indicative of more mature lint fiber (NCCA, 1993). Because PHY 499WRF is a full season variety, it conceivably should have more time to mature its bolls relative to a short season variety such as PHY 222WRF.

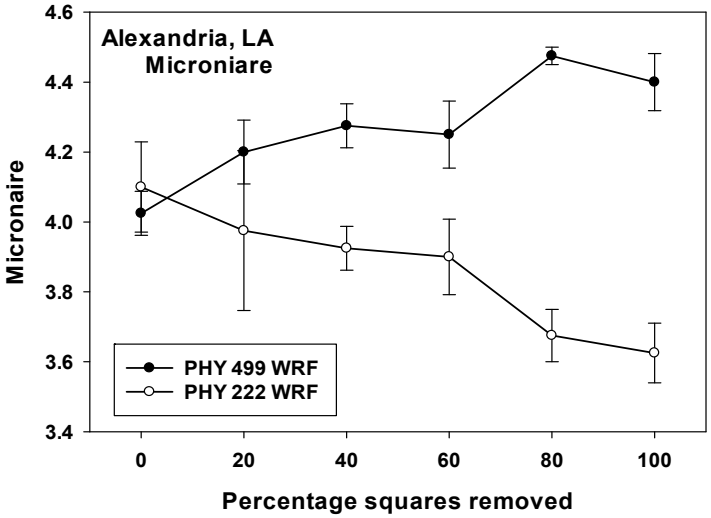

Figure 5. PHY 499WRF and PHY 222WRF micronaire.

The reason for the variety × square removal interaction for % uniformity was less clear due to the lack of a uniform trend (Figure 6). Phytogen 222WRF had a higher % uniformity value when 40% of the squares were removed, but a lower value when 80% of the squares were removed. The mean % uniformity index for both varieties ranged from approximately 85-86.5%, this suggests that uniformity was very high regardless of the square removal treatment (Cotton Incorporated, 2013). Thus the slight variation in the % uniformity index observed between PHY 499WRF and PHY 222WRF was economically insignificant, and may represent artifacts in sample handling or may be attributed to differences in varietal maturities and their distribution of fiber qualities (Bauer et al., 2009).

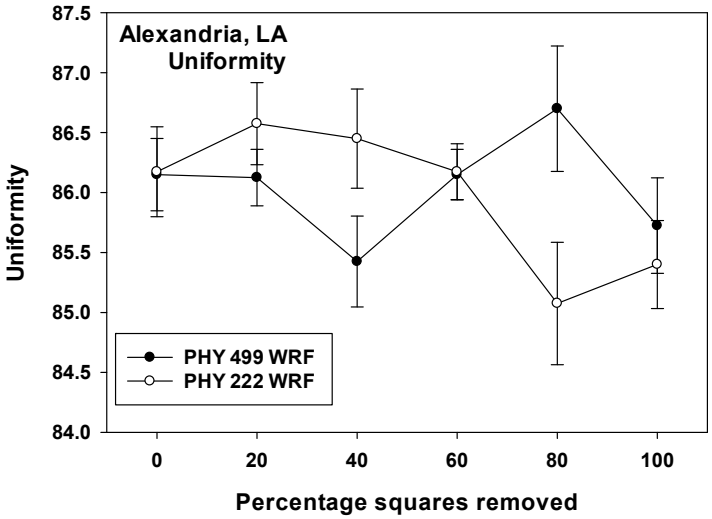

Figure 6. PHY 499WRF and PHY 222WRF uniformity.

Northeast Research Station (St. Joseph, Louisiana)

There was no detectable variety × square removal interaction for yield at the St. Joseph test location (Table 6). When pooled, yields tended to decrease with increasing square removal, but there was no significant difference between the 0 and 20% square removal treatments, which suggests some compensation. When compared to the 100% square removal treatment, the 0 and 20% square removal treatments yielded significantly higher.

Table 6. Mean ± SEM of yield across varieties subjected to various degrees of pre-bloom square removal for two cotton varieties at St. Joseph, LA.

Percentage of squares removed	Yield (lint lbs./acre)
0	1099.59 ± 98.87a
20	901.26 ± 62.92ab
40	819.18 ±74.28bc
60	803.79 ± 58.22bc
80	797.40 ± 80.68bc
100	603.89 ± 47.77c
Variety × square removal interaction	$p = 0.6998$

Means in a column within variety or percentage of squares removed followed by the same letter are not significantly different based on an F-protected Tukey's HSD Test ($p \geq 0.05$).

Though the variety × square removal interaction was not significant for yield, each variety displayed some important features. Based on the regression model, PHY 499WRF may have partially compensated for pre-bloom square loss (Figure 7). Approximately 300 lbs of yield was lost when 20-80% of pre-bloom squares were removed, while roughly 400 pounds of yield was lost when 100% of pre-bloom squares were removed (Figure 7). Yields appeared flat between 20% square removal and 80% square removal, which suggests that plants at the 40, 60, and 80% treatments may have been able to compensate for pre-bloom square loss equal to 20% square removal. However, compensation in this case is not certain; environmental factors may have prevented the 20 and 40% square removal treatments from additional compensation beyond the 60 and 80% square removal treatments. The yield response of Phytogen 222WRF to square removal was linear, which suggests a consistent reduction in yield as a result of increasing square removal (Figure 8). The apparent ability of PHY 499WRF to maintain a consistent yield from 20 to 80% square removal relative to PHY 222WRF, suggests that longer season varieties may physiologically have more time to compensate early season square loss than short season varieties, or that the shorter season variety was more severely impacted by adverse environmental conditions.

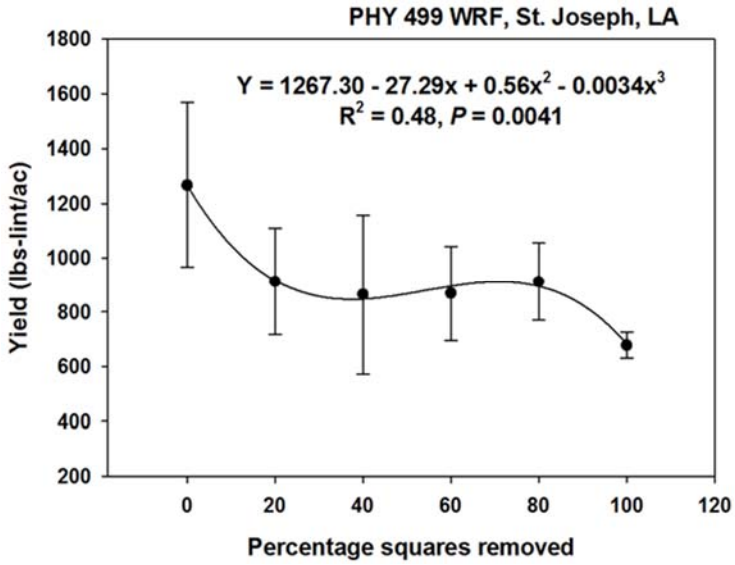

Figure 7. PHY 499WRF yield as influenced by pre-bloom square removal. F (3, 20) = 6.076.

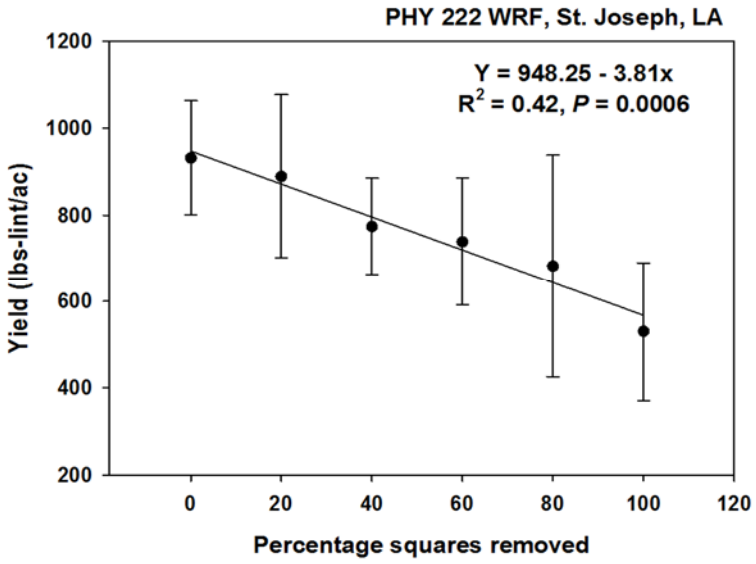

Figure 8. PHY 222WRF yield as influenced by pre-bloom square removal. F (2, 21) = 10.45.

At the St. Joseph test location there was no detectable variety × square removal interactions with regard to the percentage of open bolls among 1st, 2nd, and 3rd+ position bolls (Table 7). Thus varieties were pooled for analysis. Although there were no significant differences among square removal treatments at the 2nd position, differences were detected at the 1st and 3rd+ positions. At the 1st position, the 0% square removal treatment had a significantly higher percentage of open bolls when compared to the 100% square removal treatment, but did not differ from the 20, 40, 60, and 80% square removal treatments. These findings were similar to that at the Alexandria, La. location in that this provides evidence that a significant amount of square removal took place at the 1st position because squares were removed at approximately 12-14 nodes, when 1st position fruit is more prevalent than 2nd and 3rd position fruit. At the 3rd+ position, the 0% square removal treatment had a significantly lower percentage of open bolls when compared to the 60% square removal treatment. All other treatments were statistically similar (Table 7). This suggests that plants that received 60% pre-bloom square removal tried to compensate for that removal by retaining more 3rd+ position squares when compared to plants that received no square removal; however, this is not certain since none of the other square removal treatments differed from the 0% square removal treatment. These data suggest that cotton at the St.

Joseph location was actually unable to effectively compensate for pre-bloom square loss and that the flat portion of the yield × percentage square removal curve for PHY 499WRF (Figure 7) was most likely due to environmental factors.

Table 7. Mean ± SEM percentages of open bolls per plot by lateral branch position across varieties subjected to various degrees of pre-bloom square removal for two cotton varieties at St. Joseph, LA.

	Percentage of open bolls		
Percentage of squares removed	1st position	2nd position	3rd+ position
0	50.54 ± 2.48a	30.08 ± 2.05a	19.39 ± 2.13b
20	47.02 ± 2.93ab	31.52 ± 2.19a	21.45 ± 2.70ab
40	43.55 ± 3.08ab	28.41 ± 2.01a	28.05 ± 2.68ab
60	37.35 ± 4.03ab	31.63 ± 2.48a	31.02 ± 4.64a
80	41.05 ± 3.42ab	32.84 ± 1.57a	26.11 ± 2.36ab
100	36.63 ± 3.20b	32.79 ± 3.24a	30.58 ± 5.42ab
Variety × square removal interaction	$p = 0.1491$	$p = 0.7382$	$p = 0.1564$

Means in a column within variety or percentage of squares removed followed by the same letter are not significantly different based on an F-protected Tukey's HSD Test ($p \geq 0.05$).

At the St. Joseph test location varieties were pooled for analysis because there was no detectable variety × square removal interaction with regard to the percentage of open bolls among the top 9+ and bottom 1-8 node bolls (Table 8). On the top 9+ nodes, there tended to be more open bolls as square removal increased and conversely among the bottom 1-8 nodes. Within the top 9+ nodes the 0, 20, and 40% square removal treatments had significantly less open bolls when compared to the 100% square removal treatment. On the bottom 1-8 nodes, the 0, 20, and 40% square removal treatments had significantly more open bolls when compared to the 100% square removal treatment, which is similar to the Alexandria location (Table 3). This simply reflects that more squares were removed from the lower portion of plants with increasing square removal, and that vertical compensation was not evident.

Table 8. Mean ± SEM percentages of open bolls per plot by vertical node positions across varieties subjected to various degrees of pre-bloom square removal for two cotton varieties at St. Joseph, LA.

	Percentage of open bolls	
Percentage of squares removed	Top 9+	Bottom 1-8
0	58.84 ± 5.87b	41.16 ± 5.87a
20	60.93 ± 3.92b	39.07 ± 3.92a
40	69.03 ± 4.24b	30.97 ± 4.24a
60	70.46 ± 4.93ab	29.54 ± 4.93ab
80	73.71 ± 3.94ab	26.29 ± 3.94ab
100	86.61 ±3.76a	13.40 ± 3.76b
Variety × square removal interaction	$p = 0.7439$	

Means in a column within variety or percentage of squares removed followed by the same letter are not significantly different based on an F-protected Tukey's HSD Test ($p \geq 0.05$).

Statistical differences were not apparent in percentage of open bolls on vegetative and reproductive branches (Table 9), which demonstrates that, across square removal treatments, cotton plants did not significantly compensate on vegetative or reproductive portions of the plant. These data, among lateral and vertical boll distribution, and on vegetative or reproductive branches, further support the supposition that cotton at the St. Joseph location was unable to effectively compensate pre-bloom square removal, and that the flat portion of the yield × percentage squares removed regression (Figure 7) probably does not truly reflect compensation.

Table 9. Mean ± SEM percentages of open bolls per plot by vegetative and reproductive branches across varieties subjected to various degrees of pre-bloom square removal for two cotton varieties at St. Joseph, LA.

	Percentage of open bolls	
Percentage of squares removed	Vegetative%	Reproductive%
0	18.65 ± 2.13a	81.35 ± 2.13a
20	22.99 ± 2.68a	77.01 ± 2.68a
40	19.37 ± 2.63a	80.63 ± 2.63a
60	16.09 ± 2.71a	83.91 ± 2.71a
80	23.90 ± 1.78a	76.10 ± 1.78a
100	24.10 ± 3.25a	75.90 ± 3.25a
Variety × square removal interaction	$p = 0.4734$	

Means in a column within variety or percentage of squares removed followed by the same letter are not significantly different based on an F-protected Tukey's HSD Test ($p \geq 0.05$).

Statistical differences were not apparent for any of the HVI fiber quality characteristics at the St. Joseph location (Table 10). Where boll compensation does occur, compensated fruit are often less mature (Kerns et al, 2016). The lack of differences in fiber quality at the St. Joseph location provides further evidence that compensation did not occur. Additionally, yield pooled across varieties (variety × square removal ($p = 0.70$)), across square removal treatments tended to decrease with increasing percentages of square removal (Table 6). The 100% square removal treatment exhibited the lowest yield and was significantly lower than the 0 and 20% treatments. The 20% square removal treatment was the only treatment that did not differ from the 0% treatment. These data provide additional evidence that fruit compensation did not occur at the St. Joseph location.

Table 10. Mean ± SEM of fiber quality characteristics across varieties subjected to various degrees of pre-bloom square removal for two cotton varieties at St. Joseph, LA.

	Fiber Quality Characteristics					
Percentage of squares removed	Gin out (percent)	Length (inches)	Uniformity (percent)	Strength (grams/tex)	MIC	Loan Value (Cents/lb.)
0	39.39 ± 0.57a	1.21 ± 0.01a	86.6 ± 0.26a	32.4 ± 0.56a	4.4 ± 0.09a	56.55 ± 0.04a
20	38.79 ± 0.56a	1.21 ± 0.01a	86.2 ± 0.27a	32.0 ± 0.27a	4.4 ± 0.04a	56.55 ± 0.05a
40	39.05 ± 0.66a	1.21 ± 0.01a	86.3 ± 0.13a	32.9 ± 0.55a	4.4 ± 0.06a	56.56 ± 0.05a
60	38.72 ± 0.63a	1.21 ± 0.00a	85.9 ± 0.36a	31.6 ± 0.63a	4.4 ± 0.07a	56.54 ± 0.05a
80	38.45 ± 0.71a	1.19 ± 0.01a	86.4 ± 0.46a	32.7 ± 0.57a	4.3 ± 0.07a	56.55 ± 0.05a
100	38.29 ± 0.71a	1.21 ± 0.01a	86.8 ± 0.36a	32.7 ± 0.62a	4.3 ± 0.08a	56.55 ± 0.04a
Variety × square removal interaction	$p = 0.42$	$p = 0.78$	$p = 0.82$	$p = 0.41$	$p = 0.17$	$p = 0.95$

Means in a column within variety or percentage of squares removed followed by the same letter are not significantly different based on an F-protected Tukey's HSD Test ($p \geq 0.05$).

Summary

In Louisiana it is not uncommon for cotton (*Gossypium hirsutum* L.) to experience pre-bloom square loss due to insect injury or abiotic factors. The objectives of this research were to quantify the effects of pre-bloom square loss on the yield and fiber qualities of early maturing vs. late season cotton cultivars. Experiments were conducted in 2016 at three distinct cotton production areas within Louisiana. These production areas were chosen based on unique soil types, production practices, and a history of cotton production. The locations selected were: Macon Ridge Research Station and Extension Center in Winnsboro, Louisiana; Northeast Research Station and Extension Center in St. Joseph, Louisiana; and Dean Lee Research Station and Extension Center in Alexandria, Louisiana. At each location, the impact

of 0, 20, 40, 60, 80 and 100% pre-bloom square removal on cotton yield, fiber quality, and within plant boll distribution was evaluated on two cotton varieties. The varieties evaluated included a full season variety, Phytogen 499WRF, and a short season variety Phytogen 222WRF. In Louisiana during 2016, precipitation was abnormally high, especially late season during boll maturation. Thus incidences of boll rot likely influenced the results.

Although there was evidence of potential yield compensation at each location, only the Alexandria location demonstrated definitive compensation. The St. Joseph location either did not compensate or had compensation masked by boll rot. The impact of square removal and compensation on fiber quality was minimal across locations. Overall, cotton in Louisiana does have the ability to compensate for 20-30% pre-bloom square loss with minimal impact on fiber quality. However, this ability can be variable and highly dependent on suitable environmental conditions. Although impact of pre-bloom square loss had minimal impact on fiber quality, full season varieties appear to be less affected than short season varieties. Based on this study, our recommendation to the cotton producers of Louisiana is to attempt to retain 80-90% of their pre-bloom squares to achieve the greatest possible yield with the least amount of negative impact.

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