Soybean Management by Application of Research and Technology (SMART) Annual Summary

MSBP Project Number: 36-2019

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CONTENTS

MISSISSIPPI STATE UNIVERSITY EXTENSION

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INTRODUCTION

The SMART program coordinated by Mississippi State University Extension and supported by the Mississippi Soybean Promotion Board is designed to assist with implementing best management practices (BMPs) and technologies into the farm level. In doing so, the latest research-proven practices can be demonstrated on the farm scale to assist with improving soybean yield and ultimately profitability.

Soybean is an integral component of Mississippi's agriculture production systems. Currently, soybean is third on the list of Mississippi's agricultural commodities. Approximately 1.63 million acres of soybeans were harvested in Mississippi in 2019 with an average yield of 50.0 bushels per acre. Overall, soybean productivity has considerably increased in recent years due to a multitude of reasons including, but not limited to, improved management, technology and seed options. However, potential for improvement of our production systems still remain.

During the 2019 production season, the SMART program consisted of demonstration and training events that promoted ideal practices to Mississippi's soybean producers. This portion of the program is intended to provide soybean growers, crop consultants and other agriculture professionals with the latest information to assist throughout the growing season.

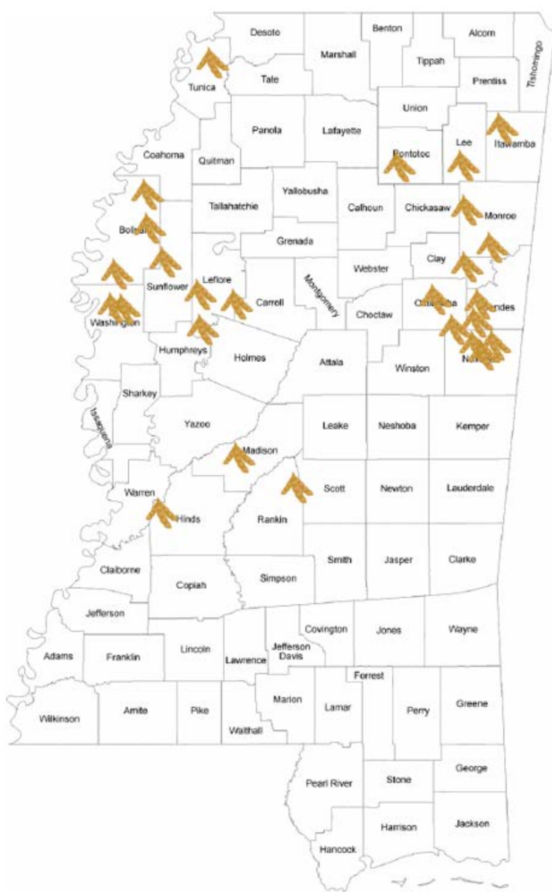


Figure 1: Map of Mississippi showing the 2019 soybean on- farm demonstration locations.

Multi-Year Project Summary

SOYBEAN VARIETY DEMONSTRATION (ONGOING PROJECT)

Purpose: To evaluate commercially available soybean varieties performance in specific environments.

Procedure: These demonstrations are done each year; each year the data is summarized and displayed as an MSU Extension publication. Soybean varieties are planted in large strips on producer fields. Varieties representing Roundup Ready, Roundup Ready 2 Yield, Roundup Ready 2 Xtend, LibertyLink, LibertyLinkGT27, and Enlist E3 traits from maturity groups recommended for Mississippi are utilized in this on-farm demonstration. Locations represent both irrigated and non-irrigated production systems. Standard agronomic practices are utilized across all varieties.

Results: A total of 205 varieties have been evaluated during the 2015 – 2019 growing seasons. These varieties represent the Roundup Ready, Roundup Ready 2 Yield, Roundup Ready 2 Xtend, LibertyLink, LibertyLinkGT27, and Enlist E3 traits. The average soybean yield across all varieties from all traits for each year were 55.7, 56.1, 58.5, 58.9, and 44.5 bushels per acre from 2015 to 2019, respectively. The yield increase observed each year; with the exception of 2019, which endured extreme adverse weather conditions, confirms that variety selection is likely the most important decision to be made each season. Results from the 2019 on-farm soybean variety demonstration can be viewed in detail beginning on page 45 of this document. With the continued develop and release of new varieties and new trait platforms, it is important to continue to conduct these on farm variety demonstrations each year so that producers have the most up to date variety information on hand to make this important management decision.

SOYBEAN VARIETY SCREENING FOR IRON DEFICIENCY CHLOROSIS MANAGEMENT (ONGOING PROJECT)

Purpose: To evaluate soybean varietal response to Iron Deficiency Chlorosis (IDC).

Procedure: Soybean varieties that are commercially available in Mississippi are planted in areas with known issues of IDC. Soybean is planted in a small plot environment, with plots measuring as 3, 15-inch rows by 15 feet long. All varieties at each location were replicated 3 times. Varietal susceptibility to IDC is evaluated throughout the growing season. Each year this data is summarized and displayed as MSU Extension publications.

Table 1: Summary of IDC Screenings conducted 2015 through 2019.

Year	Maturity Group	Total Varieties Screened
2015	MG V	42
2016	MG V	28
2017	MG IV	37
2017	MG V	34
2018	MG IV	66
2018	MG V	32
2019	MG IV	80
2019	MG V	34

Results: No variety has been found to be completely tolerant to IDC. However, some varieties have demonstrated the ability to quickly recover from IDC symptoms and continue to develop normally throughout the remainder of the growing season. Because it has been found that varieties do vary greatly in susceptibly to IDC, it is important to continue to conduct this screening each year due to the constant changes in commercially available soybean varieties. Each year, the results from the Soybean Variety Response to IDC are published and available to producers. These results annually provide producers with options to combat IDC in their production fields; results from 2019 can be viewed in detail on pages 38 – 42 of this document.

SOYBEAN YIELD RESPONSE TO FOLIAR FUNGICIDES (ONGOING PROJECT)

Purpose: To evaluate the effect of an automatic foliar fungicide application on soybean growth and yield.

Procedure: During the 2015, 2016, 2017, 2018, and 2019 growing seasons, on-farm fungicide demonstrations were conducted in large scale plots located on producer fields. All fungicides were applied foliar during the late reproductive growth stages of the soybean production. All plots contained an untreated check for comparison purposes. Soybean was evaluated for benefits from the automatic fungicide applications.

Table 1: Soybean yield averaged over all fungicide demonstration locations from 2015 – 2019.

Fungicide Treatment	Soybean Yield (bu/ac)		
	Irrigated	**Non-Irrigated**	**Overall**
Fungicide Applications	69.2	65.6	66.9
No Fungicide Application	66.8	65.2	65.4

Results: Data combined across 2015, 2016, 2017, 2018, and 2019 (Table 1) suggest that overall locations, an automatic fungicide application to soybean will increase yield by 1.5 bushels per acre. When broken down by irrigated environments versus rain fed environments, an automatic fungicide application increased yields by 2.4 and 0.4 bushels per acre, respectively.

EVALUATION OF BEST MANAGEMENT PRACTICES ON NON-IRRIGATED SOYBEAN DEVELOPMENT AND YIELD (ONGOING PROJECT)

Purpose: To evaluate the effects of different management practices on non-irrigated soybean growth, development, and yield.

Procedure: This experiment was conducted at 10 locations in Mississippi during the 2016, 2017, 2018, and 2019 growing seasons. Each site was planted with an indeterminate maturity group IV soybean variety. There were three different treatments which consisted of different management practices further described in Tables 1-3.

Table 1: Low input management treatment described.

Input	Rate	Timing
Asgrow 4632	85,000 seeds/A	Planting
Roundup PowerMax	32 fl oz/A	V3
Roundup PowerMax	32 fl oz/A	R1

Table 2: Standard management treatment described.

Input	Rate	Timing
0-0-60	70 Units	Pre-Plant
Asgrow 4632	110,000 seeds/A	Planting
Revise SB F (Seed Trt)	-	Planting
Dual Magnum	16 fl oz/A	Preemergence
Roundup PowerMax	32 fl oz/A	V3
Roundup PowerMax	32 fl oz/A	R1
Quadris	4 fl oz/A	R3
Discipline 2 EC	6.4 fl oz/A	R3
NIS	0.25% v/v	As needed

Table 3: Full management treatment described.

Input	Rate	Timing
0-0-60	90 Units	Pre-Plant
Asgrow 4632	140,000 seeds/A	Planting
Revise SB + (Seed Trt)	-	Planting
Gramoxone SL 2.0	32 fl oz/A	Preemergence
Boundary 6.5 EC	16 fl oz/A	Preemergence
Roundup PowerMax	32 fl oz/A	V3
Prefix	32 fl oz/A	V3
Roundup PowerMax	32 fl oz/A	R1
Quadris Top	8 fl oz/A	R3
Discipline 2 EC	6.4 fl oz/A	R3
Priaxor	4 fl oz/A	R5
Domark	4 fl oz/A	R5
Gramoxone SL 2.0	16 fl oz/A	R6.5
Defol 5	3 lb/A	R6.5
NIS	0.25% v/v	As needed

Table 4: Data collected in each treatment averaged across all locations and years.

	Low Input Management	Standard Management	Full Management
14 DAP Crop Vigor	6.70 c	7.27 b	7.80 a
28 DAP Crop Vigor	6.77 b	7.30 a	7.53 a
Plant Height (cm)	79.84 b	84.39 a	86.86 a
Stand Count 14 DAP	70,450 c	84,752 b	102,274 a
Yield (bu/ac)	39.28 b	44.79 a	46.57 a

Results: These data reveal that the management practices described under the full management treatment resulted in greater crop vigor than the standard and low input treatments 14 DAP. Full and standard management treatments also had higher crop vigor than the low input treatment 28 DAP. Soybean in the full management and standard treatments were significantly taller than those in the lower input treatment. As expected, stand counts decreased when management practices became less intensive. The full management treatment resulted in greater yield when compared to the low input management treatment.

FUNGICIDE APPLICATION TIMING
(STUDENT PROJECT – 2017 & 2018)

Purpose: To determine if delaying the timing of a preventative foliar fungicide application to later growth stages results in similar yield observed following applications made at the R3 timing.

Procedure: Experiments were conducted in 2017 and 2018 at the R.R. Foil Plant Science Research Center near Starkville, MS and at the Delta Research and Extension Center near Stoneville, MS. Treatments consisted of five application timings, using three different fungicide options, with an untreated check for comparison purposes. Fungicide treatments included Quadris® (Azoxystrobin), Quadris Top® SBX (Azoxystrobin, Difenconazole), and the combination of Priaxor® (Fluxapyroxad, Pyraclostrobin) and Domark® (Tetraconazole). Fungicide products were applied in single applications at the R3, R4, R5, or R6 growth stages, along with a two-pass application program at R3 followed by R5. Data collected included: evaluation of color differentiation with Canopeo and Trimble Greenseeker, defoliation and green stem visual ratings, 100ct seed weights and overall grain yield. Additionally, grain quality analysis from samples collected at harvest were performed by Mid-South Grain Inspection Services, a USDA certified grain inspection facility, to compare grain quality of harvested seed from each of the different fungicide application timings.

Figure 1: Soybean yield averaged across application products, locations, and years.

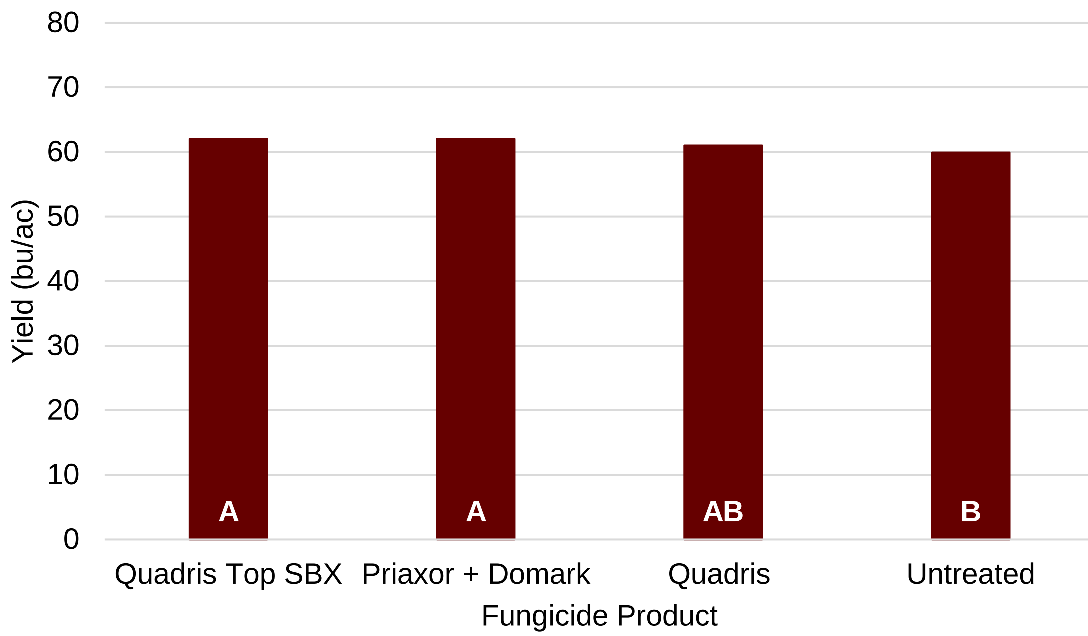


Figure 2: Soybean yield averaged across fungicide application timings, locations, and years.

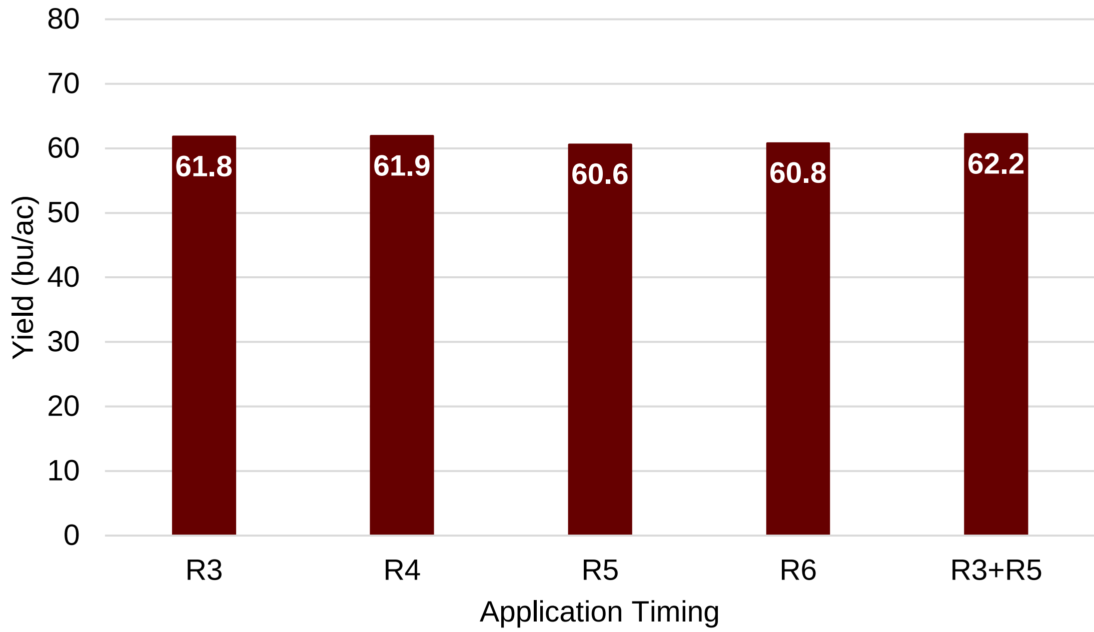


Figure 3: Percent increase in seed mass averaged across fungicide product, location, and years.

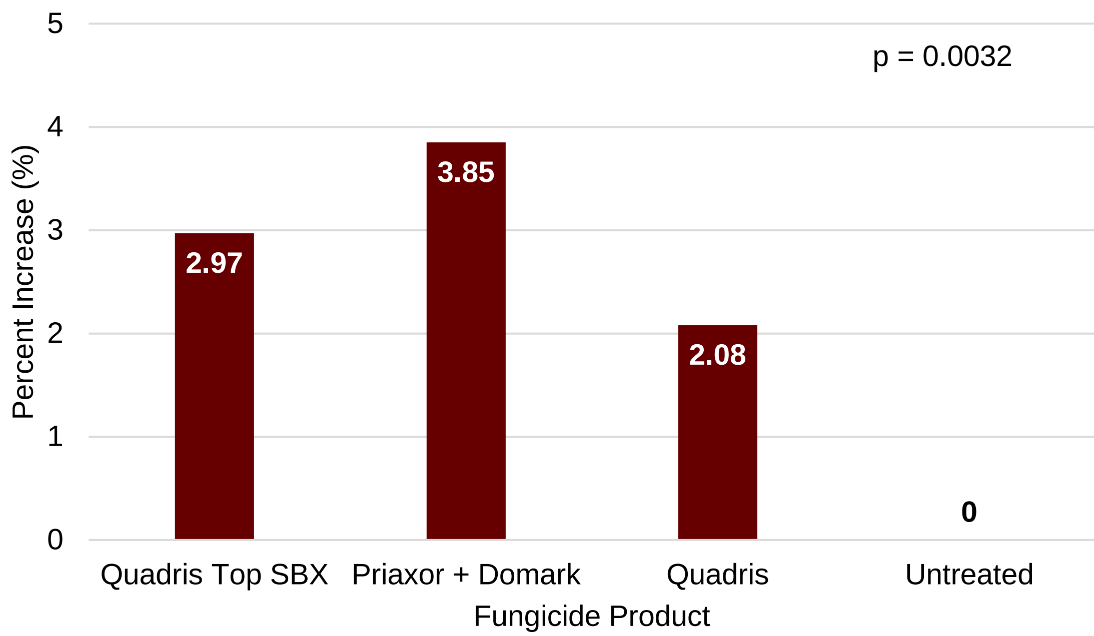


Figure 4: Soybean seed damage scores averaged across application timing. fungicide product, locations, and years.

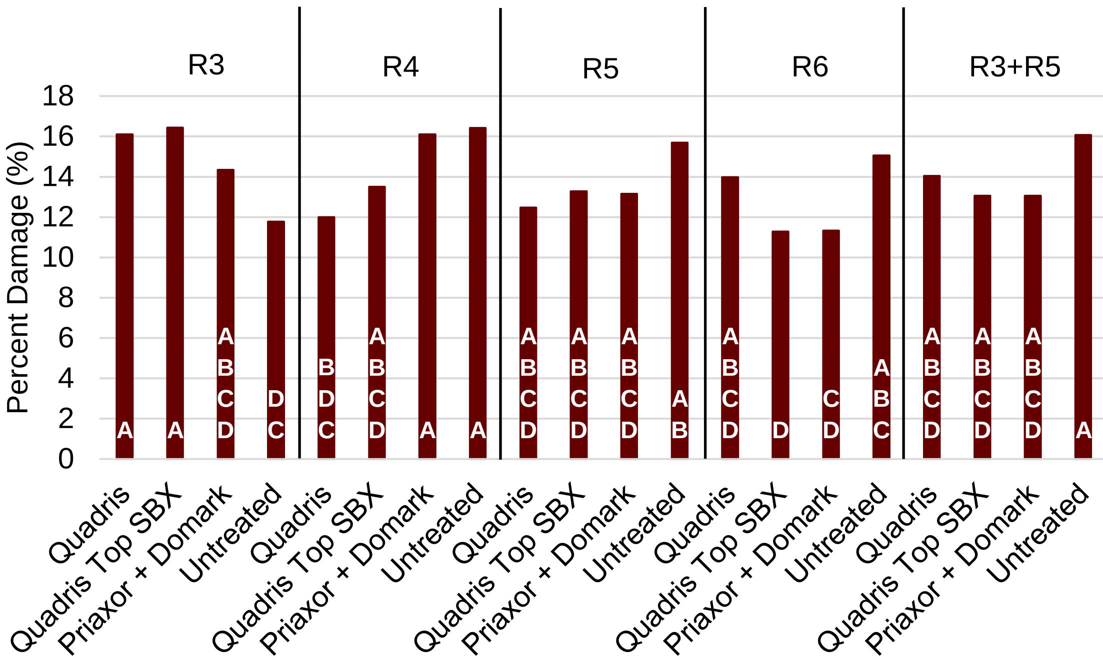


Table 1: Net Return above treatment at different application method costs at different estimated market prices.

Application Method	Aerial Application			Ground Application		
Soybean Market Price	**$8.00 bu**	**$9.00 bu**	**$10.00 bu**	**$8.00 bu**	**$9.00 bu**	**$10.00 bu**
Fungicide Product	**-------------$ per acre-------------**			**-------------$ per acre-------------**		
Untreated Control	-----	-----	-----	-----	-----	-----
Quadris	($0.89)	$0.48	$1.89	$2.11	$3.48	$4.89
Quadris (Two-Pass App.)	($23.52)	($22.48)	($21.41)	($17.52)	($16.48)	($15.41)
Quadris Top SBX	$4.21	$7.03	$9.94	$7.21	$10.03	$12.94
Quadris Top SBX (Two-Pass App.)	($17.21)	($13.83)	($25.35)	($11.21)	($7.83)	($4.34)
Priaxor D	($5.13)	($2.45)	$0.77	($2.13)	$0.55	$3.31
Priaxor D (Two-Pass App.)	($29.57)	($25.22)	($20.47)	($23.57)	($19.21)	($14.74)

Results: Results indicate soybean receiving an application of Quadris Top SBX or Priaxor + Domark yielded greater when compared to soybean that did not receive a fungicide application (Figure 1). Application of Quadris showed no differences when compared to the untreated check. Similar trends were observed when analyzing seed mass, soybean receiving a multi-mode of action fungicide application resulted in an overall increase in seed mass when compared to soybean receiving no fungicide (Figure 3). In addition, timing of fungicide application resulted in no yield difference when applied at any growth stage evaluated (Figure 2). After seed damage was assessed, damage percentages were determined using a USDA certified dockage scale and a monetary loss was established for each treatment, this price along with the cost of the treatment were deducted from the gross revenue. This showed the net return above a fungicide treatment. At the lowest estimated market price ($8.00/ bu) Quadris Top SBX was the only treatment to result in profitability when figured as an aerial application. Quadris Top SBX application resulted in an average profitability of $4.21 (per acre) at this price (Table 1). These data suggest that if making preventative fungicide application in soybean, producers should apply a multi-mode of action treatment at a single timing.

FUNCTIONS EVALUATION ACROSS ROW SPACING, PLANTING DATE, AND PRODUCT (STUDENT PROJECT – 2017 & 2018)

Purpose: To evaluate the effects of preventative fungicide applications across multiple planting dates and row spacings on irrigated soybean growth, development, and yield.

Procedure: Experiment were conducted in 2018 at the R.R. Foil Plant Science Research Center near Starkville, MS and Black Belt Branch experiment station near Brooksville, MS. Three row spacings, ultra-narrow (15”), narrow (30”) and wide (38”) row soybean were planted on two planting dates, late-April and late-May. Fungicide treatments included Quadris® (Azoxystrobin), Quadris Top® SBX (Azoxystrobin, Difenconazole), and the combination of Priaxor® (Fluxapyroxad, Pyraclostrobin) and Domark® (Tetraconazole). All applications were made at the R4 growth stage. An untreated check was included for each row spacing and planting date for comparison purposes. Grain quality analysis from samples collected at harvest were performed by Mid-South Grain Inspection Services, a USDA certified grain inspection facility, to compare quality following each treatment. These quality ratings were then applied to USDA certified dockage scales to analyze the profitability of each treatment.

Figure 1: Yield averaged across planting dates, and locations

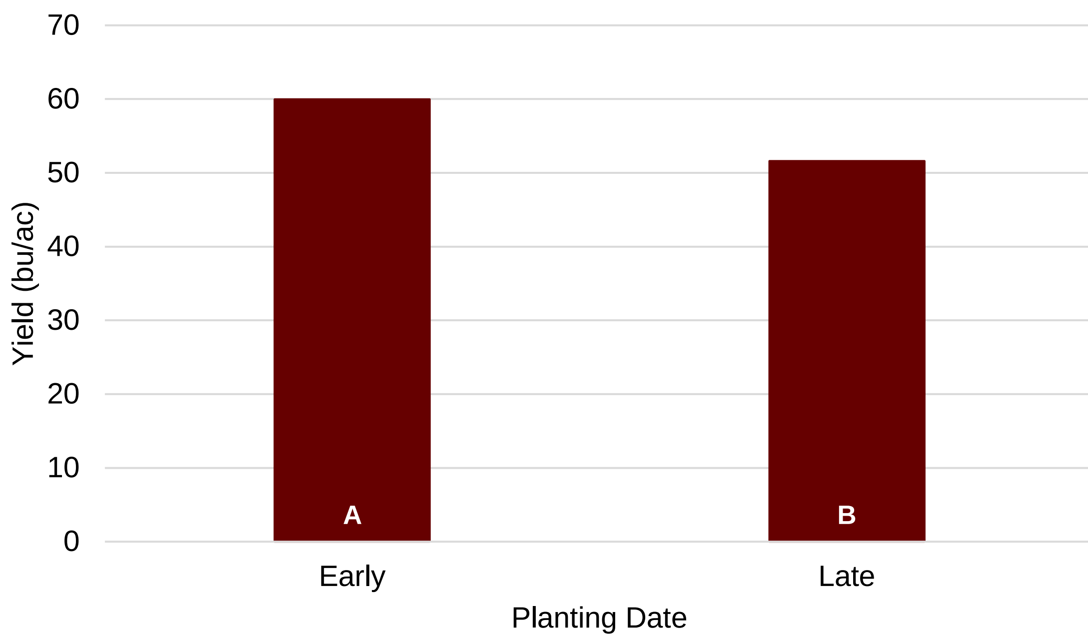


Figure 2: Seed quality damage scores averaged across planting dates and locations.

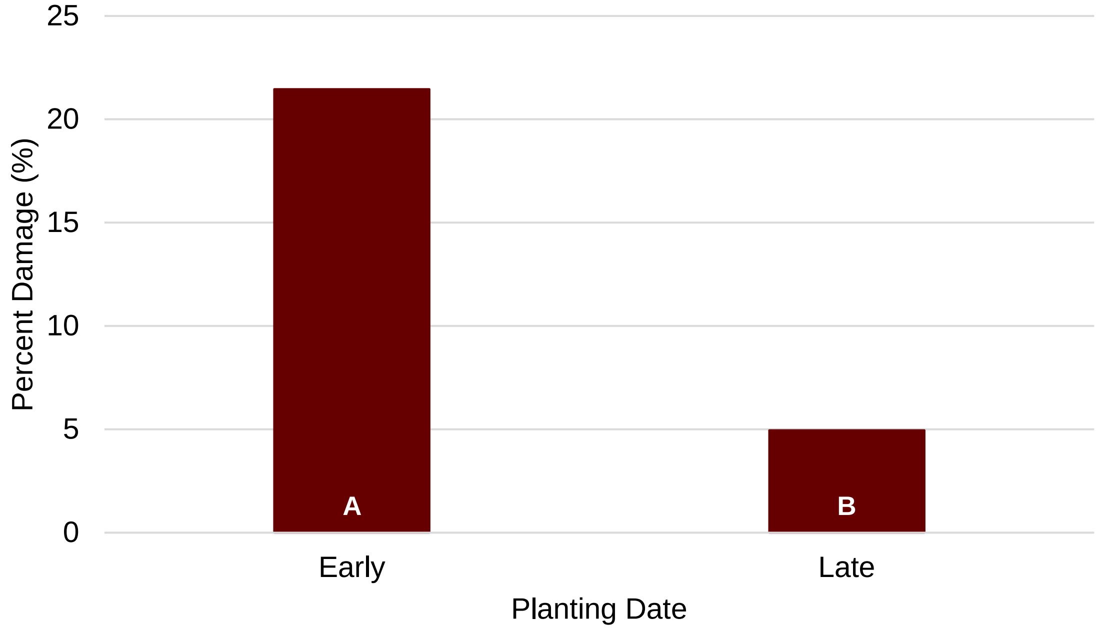


Table 1: Effect of planting date on seed damage, seed mass, deductions, and net return.

Treatment	Agronomics		Economics	
	Seed Damage (%)	Yield (bu/ac)	Deduction $ Acre	Net return above Treatment
Early Planting Date	21 a	59.96 a	$26.01	$459.30
Late Planting Date	4.8 b	51.61 b	$5.68	$401.10

Results: Results from 2018 indicate soybean planted early yielded greater when compared to those planted later in the planting window (Figure 1). When comparing Early vs. Late planting damage percentages, when planting earlier, damage was greater than seed harvested from soybean planted during the later planting window (Figure 2). When economics were evaluated, the yield benefit observed when planting early outweighs the larger deductions, thus increasing overall net return above treatment (Table 1). These data suggest that soybean yield response to foliar fungicides applied automatically at the R4 growth stage are similar across differing row spacings and planting dates. These data also confirm that the implementation of the Early Soybean Planting System continues to be a successful practice, despite the greater seed damage that was observed in 2018.

EVALUATION OF PLANTING DATE AND ROW SPACING ON SOYBEAN DEVELOPMENT AND YIELD (STUDENT PROJECT – 2016, 2017 & 2018)

Purpose: To evaluate the effects of row spacing and planting date on non-irrigated soybean growth, development, and yield.

Procedure: This experiment was conducted at 5 locations in Mississippi during the 2016, 2017, and 2018 growing seasons. All field sites were planted with an indeterminate maturity group IV soybean variety. Soybean was planted at a seeding rate of 130,000 seeds per acre across 5 planting dates with targeted plantings at Mid-April, Early May, Mid-May, Early June and Mid-June. Row spacings consisted of 15, 30, and 38-inch rows.

Table 1: Plant height, node, and yield data collected averaged across all locations and years.

	Mid-April	Early May	Mid-May	Early June	Mid-June
Height (cm)	71.34 c	84.67 a	84.47 a	83.21 a	76.48 b
Node	19.53 b	20.57 a	19.71 b	18.42 c	16.52 d
Yield (bu/ac)	43.58 ab	49.79 a	44.49 ab	40.27 bc	33.68 c

Table 2: Plant heights collected at all row spacing averaged across all locations and years.

Row Spacing (in)	Height (cm)
15	77.15 b
30	81.81 a
38	81.13 a

Results: There was no significant interaction observed between row spacing and planting date, indicating that soybean row spacing does not influence overall soybean yield in non-irrigated environments. As expected, planting date significantly influenced soybean height, total number of nodes, and yield. These data reveal that plants grew taller when planted in Early May, Mid-May and Early June when compared to Mid-April and Mid-June (Table 1). The total number of nodes were greatest when soybean was planted during Early May when compared to those planted during Mid-April, Mid-May, Early June and Mid-June (T4able 1). Later planting dates resulted in lower soybean yield compared to earlier planting dates (Table 1). Row spacing significantly affected plant height. Row spacings of 30 and 38 inches had larger plants than 15-inch row spacing (Table 2). These data suggest that a full change to a specific row spacing in non-irrigated production systems is not warranted. Producers can plant in those row configurations most convenient to their individual operations. However, the Early Soybean Production System should always be implemented as conditions allow in order to maximize soybean yield potential in non-irrigated environments.

EVALUATION OF IRON DEFICIENCY CHLOROSIS (IDC) MANAGEMENT STRATEGIES ON SOYBEAN DEVELOPMENT AND YIELD (STUDENT PROJECT – 2016, 2017 & 2018)

Purpose: To evaluate the effects of Iron Deficiency Chlorosis (IDC) on non-irrigated soybean growth, development, and yield.

Figure 1: Common symptoms of Iron Deficiency Chlorosis

Procedure: Experiments were conducted at 2 locations in Mississippi during the 2016 growing season, 3 locations in the 2017 growing season, and 2 locations in the 2018 growing season. These locations were the Black Belt Experiment Station near Brooksville, MS and off-station locations near Prairie, MS and Okolona, MS. These sites were planted with an indeterminate maturity group V soybean variety with known susceptibility to Iron Deficiency Chlorosis (IDC). Plots were planted at a rate of 120,000 seeds per acre on 30-inch rows. Plots were 4 rows wide by 40 feet long. The middle two rows were treated while leaving running checks on rows 1 & 4. Treatments included 3 products, 3 application timings, and 4 rates. In 2016, these products were the following: Iron Plus (5% Fe) by Delta Ag, Sequestar 13.2% EDTA by Brandt, and Sequestar 6% EDDHA by Brandt. In 2017 & 2018, Iron Plus was replaced by F227-G (40% Fe) by Frit Industries at rates of 0.5, 1.0, 1.5, 2.0 lbs ai/ac. All other products were applied at a rate of 0.6, 0.12, 0.18, and 0.24 lb ai/ac. Each rate was applied foliar, in-furrow and a split application except for the F227-G; which was always applied in-furrow at planting. Foliar applications were made when the soybeans reached the V3 growth stage. Each application timing/method was treated as a separate experiment. Data collected included: stand counts, weekly IDC ratings (1-no symptoms, 9-dead), plant heights/nodes, and yield measured in bushels per acre. Stand counts were recorded after emergence and again at harvest to monitor the plant population. Plant heights and nodes were recorded at the R5.5 growth stage. The center two rows of each plot were machine harvested to determine final soybean yield. The experimental design is a randomized complete block design.

Figure 2: Visual differences between treated rows and untreated rows when Sequestar 6% EDDHA is applied in-furrow.

Table 1: Yield response to foliar applied iron products averaged over all locations and years

Rate[1]	Sequestar 6%	Sequestar 13.2%	Iron Plus	F227-G	Untreated
	--- Yield (bu/ac) ---				
1	17.98 abcd	16.64 cd	18.78 abcd	17.98 bcd	18.50 abcd
2	16.52 d	18.28 abcd	20.66 ab	18.87 abcd	
3	18.50 abcd	19.53 ab	21.66 a	18.41 abcd	
4	18.37 abcd	18.96 abc	20.38 ab	17.68 bcd	

[1]Rates labeled 1, 2, 3, 4 are 0.06, 0.12, 0.18, and 0.24 lb ai/ac, respectively for Sequestar 6%, Sequestar 13.2%, and Iron Plus. Rates labeled 1, 2, 3, 4 are 0.5, 1.0, 1.5, and 2.0 lb ai/ac, respectively for F227G.

Table 2: Yield response to in-furrow iron products averaged over all locations and years

Rate[1]	Sequestar 6%	Sequestar 13.2%	Iron Plus	F227-G	Untreated
	--- Yield (bu/ac) ---				
1	14.95 abc	14.33 abc	12.03 c	13.19 abc	13.75 abc
2	16.84 a	15.16 abc	14.43 abc	14.61 abc	
3	14.79 abc	14.35 abc	12.80 bc	14.39 abc	
4	4	15.69 ab	14.62 abc	12.57 bc	

[1]Rates labeled 1, 2, 3, 4 are 0.06, 0.12, 0.18, and 0.24 lb ai/ac, respectively for Sequestar 6%, Sequestar 13.2%, and Iron Plus. Rates labeled 1, 2, 3, 4 are 0.5, 1.0, 1.5, and 2.0 lb ai/ac, respectively for F227G.

Table 3: Yield response to split applied iron products averaged over all locations and years

Rate[1]	Sequestar 6%	Sequestar 13.2%	Iron Plus	F227-G	Untreated
	----- Yield (bu/ac) -----				
1	21.95 abcd	22.25 abcd	23.04 abcd	23.62 abc	21.12 bcd
2	22.07 abcd	23.64 ab	20.43 bcd	20.21 cd	
3	23.13 abcd	21.73 abcd	22.05 abcd	19.20 d	
4	24.24 a	22.50 abcd	23.53 abcd	22.27 abcd	

[1]Rates labeled 1, 2, 3, 4 are 0.06, 0.12, 0.18, and 0.24 lb ai/ac, respectively for Sequestar 6%, Sequestar 13.2%, and Iron Plus. Rates labeled 1, 2, 3, 4 are 0.5, 1.0, 1.5, and 2.0 lb ai/ac, respectively for F227G.

Results: These data revealed that yield was not significant in the foliar, split, or in-furrow experiments. This is likely due to the sporadic nature of IDC. Visual symptoms of IDC were reduced when Sequestar 6% was applied at rates of 0.18, and 0.24 lbs ai/ac when compared to the untreated check 14, 28, and 42 DAP (not shown). Sequestar 6% at rates of 0.18, and 0.24 lbs ai/ac had lesser visual symptoms than any of the other treatments 14 and 28 DAP (not shown). While the irregularity of iron deficiency chlorosis within plots caused yield to not be significant, the Sequestar 6% at rates of 0.18 and 0.24 lbs ai/ac consistently showed positive results in affected areas as shown in Figure 2.

EVALUATION OF OPTIMAL SEEDING RATE AND PLANTING APPROACH FOR REPLANT SITUATIONS IN SOYBEAN (STUDENT PROJECT – 2016 & 2017)

Purpose: This study was conducted in order to determine the optimal replant seeding rate for various levels of reduced soybean populations.

Procedure: Experiments were conducted at four locations in Mississippi during the 2016 and 2017 growing seasons. These locations were the R.R. Foil Plant Science Research Center near Starkville, MS in 2016 and 2017 and the Black Belt Experiment Station near Brooksville, MS in 2016 and 2017. The seed was planted with a plot planter at a seeding rate of 130,000 seeds per acre using an indeterminate maturity group IV variety. Treatments at the initial planting date included combinations of Roundup Ready 2 Xtend and LibertyLink soybean seed. Percentages of RR2X/LL were as follows 100/0, 75/25, 50/50, 25/75 and 0/100 (Table 1). In order to simulate a failed stand, plots were sprayed with glyphosate at the V1 growth stage to eliminate the LL variety, which were randomly distributed throughout the row. Plots were replanted approximately 2 weeks after the initial planting date. The replant percentages of RR2X were 100, 75, 50, 25 and 0, resulting in 25 total treatments and these were planted into the existing plots from the initial planting. Test plots measured four, 38 inch rows wide by 40 feet in length. All treatments were irrigated as needed and replicated 4 times.

Data collected included stand counts, weekly growth stages, canopy closure dates, plant heights, and yield. Stand counts were recorded after emergence and again at harvest to monitor the plant population. Plant heights were recorded at canopy closure and again at the R5.5 growth stage. In addition, final node counts were recorded prior to harvest. The center two rows of each plot were machine harvested to determine final soybean yield. The experimental design is a randomized complete block with a factorial arrangement of treatments with factor A being planting date, factor B being seed treatment, and factor C being seeding rate.

Table 1. Treatments further described.

Initial RR2X/ LL %	Replant Percentage %				
	0	25	50	75	100
100/0	100/0	100/25	100/50	100/75	100/100
75/25	75/0	75/25	75/50	75/75	75/100
50/50	50/0	50/25	50/50	50/75	50/100
25/75	25/0	25/25	25/50	25/75	25/100
0/100	0/0	0/25	0/50	0/75	0/100

Figure 1. Pictures following the glufosinate application to show removal percentage.

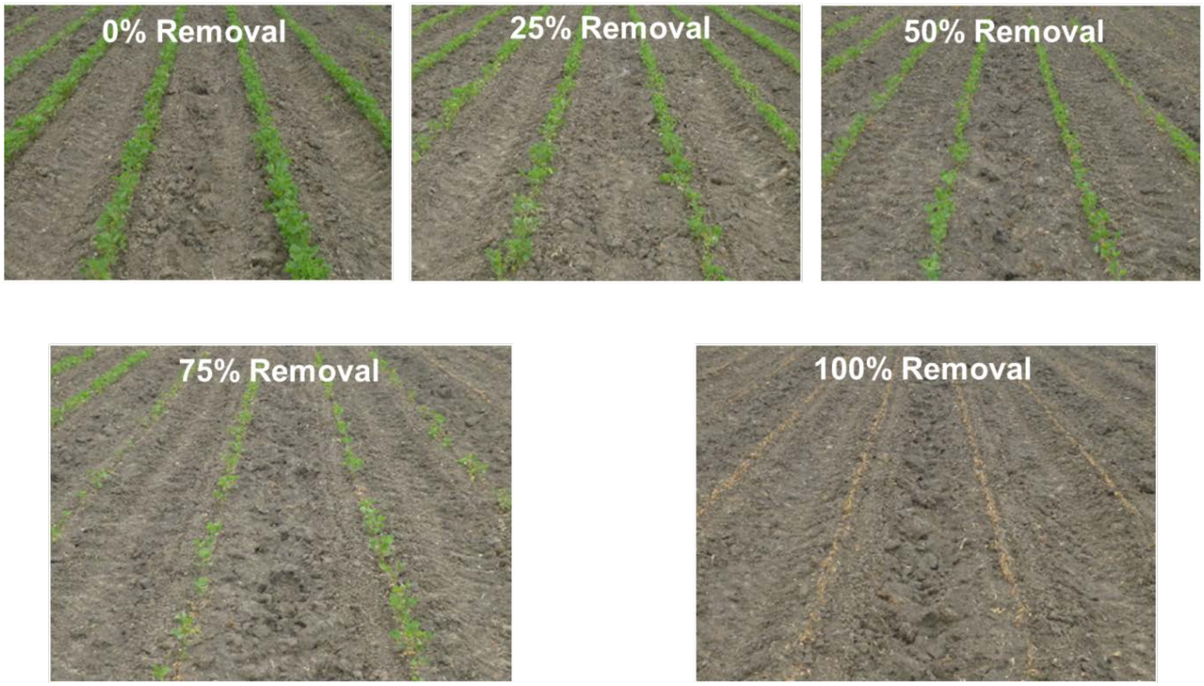


Figure 2. Soybean plant heights averaged across all years and locations.

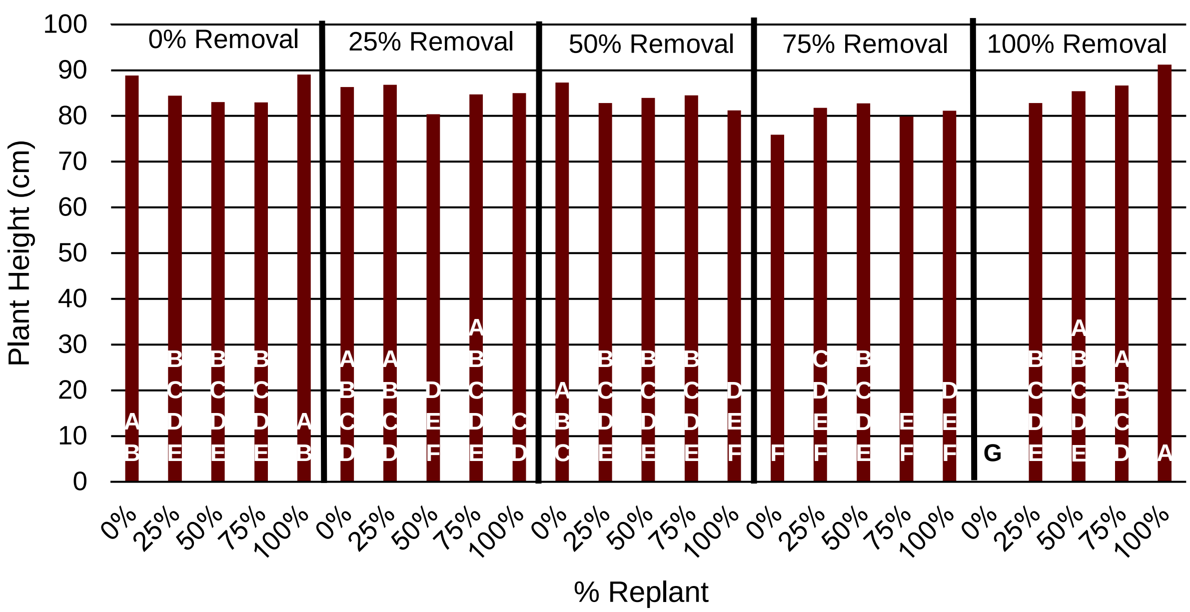


Figure 3. Soybean node counts averaged across all years and locations.

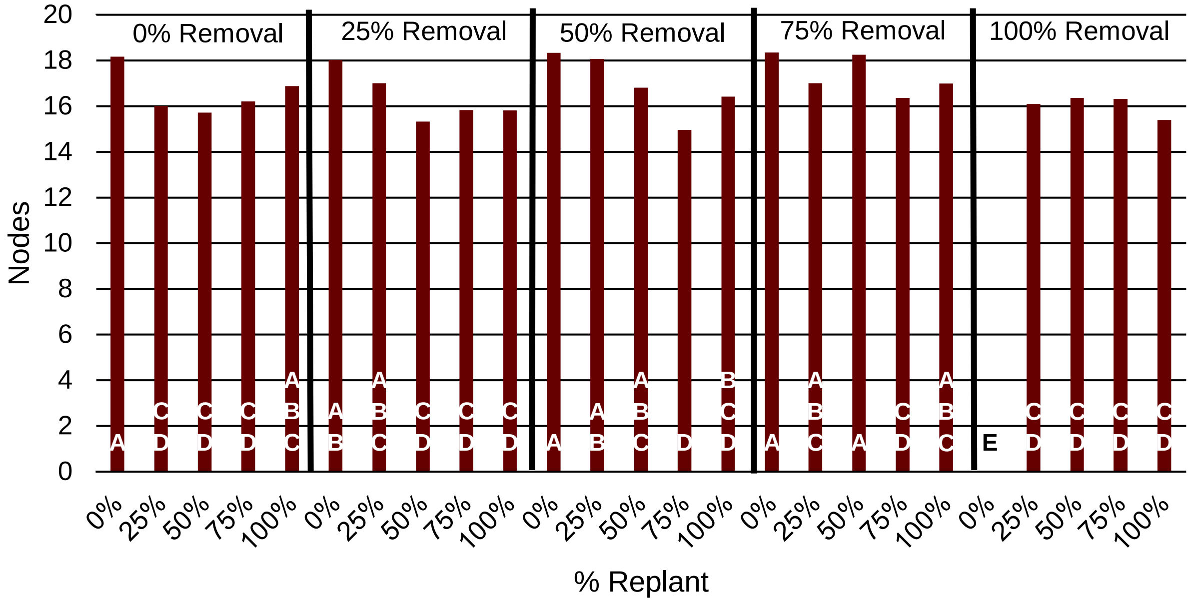
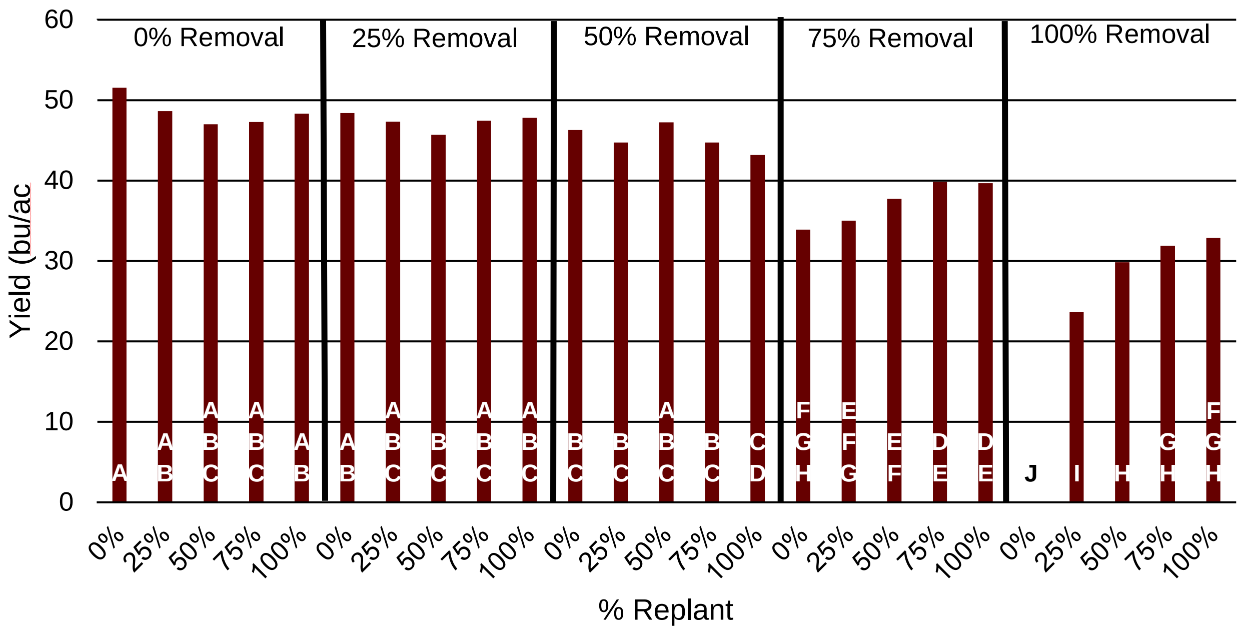


Figure 4. Soybean yield averaged across all years and locations.



Results: The combination of soybean stand removal and replant resulted in significant differences among soybean yield, as well as, node and plant heights. Soybean yield for the treatment of 0/0% removal/replant was greater than that of the 100/100% removal/replant. No soybean yield difference was observed for treatments of 50/50% removal/replant and 0/0% removal/replant. When 75% of the initial population was removed, soybean yield was maximized by replanting at least 75% in the existing stand. No significant plant height difference was observed for the treatments of 0/0% removal/replant and 100/100% removal/replant. Final node count indicated a significant difference among the 0/0% removal/replant and 100/100% removal/replant.

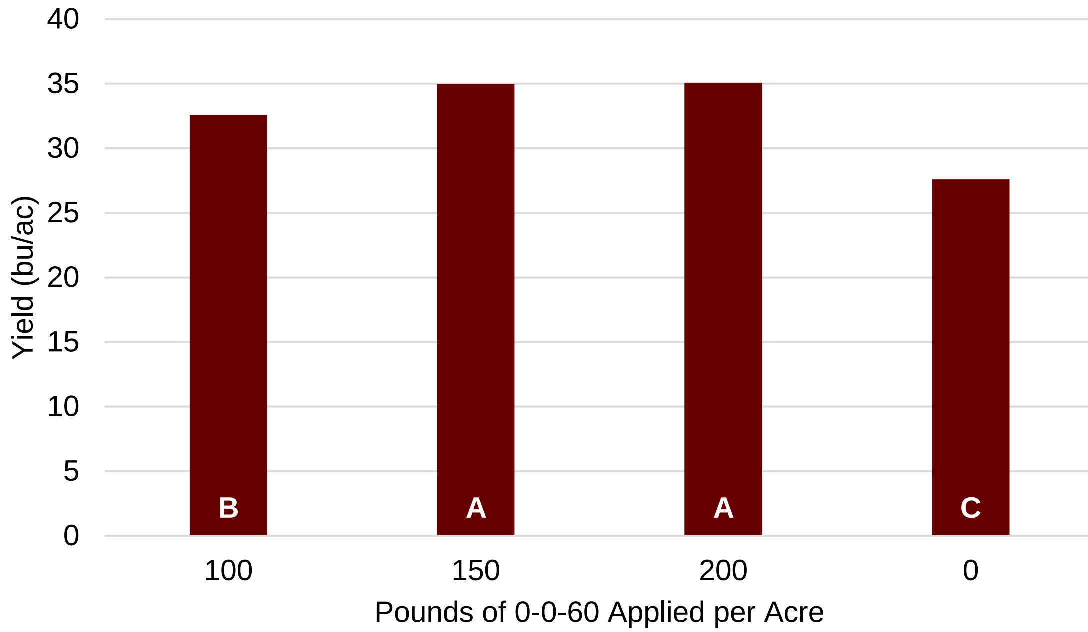
SOYBEAN YIELD RESPONSE TO POTASSIUM FERTILIZER (2016 & 2017)

Purpose: This demonstration field was found to be extremely deficient in potassium. Thus, the demonstration was designed to evaluate the effect of potassium fertilizer (0-0-60) on soybean yield when applied at various rates.

Procedure: This demonstration trial was conducted during the 2016 and 2017 growing seasons in Prentiss County near Baldwyn, Mississippi on 38 inch single row planted soybeans. Potassium (0-0-60) was applied at three rates (Table 1) along with an untreated check where no potassium was applied for comparison. The three application rates were 100, 150, and 200 pounds per acre. Soil samples were collected prior to planting and at harvest to monitor nutrient availability. Soybean yield was collected to determine the effectiveness of the potassium applications.

Figure 2. Visual potassium deficiency symptoms observed at the 2017 field site.

Table 1. Yield differences observed among different application rates of potassium fertilizer, averaged across years.



Results: Data analyzed across both years (2016 and 2017) suggests that the addition of potassium fertilizer (0-0-60) resulted in greater yields compared to treatments that received no potassium fertilizer. These demonstration results should serve as an example for how proper soil sampling and nutrient management can improve soybean yield where nutrient deficiencies often result in lower yield potential.

SOYBEAN YIELD RESPONSE TO NEMATICIDE SEED TREATMENT IN NON-IRRIGATED PRODUCTION SYSTEMS (2015, 2016 & 2017)

Purpose: To evaluate the effect of nematicide seed treatments on soybean yield.

Procedure: Nematicide seed treatments were evaluated in 2015, 2016, and 2017. Nematicide seed treatments were applied to a soybean variety with known tolerance to SCN. These demonstrations were conducted in large scale plots in producer fields that had historically had avsoybean cyst nematode population (SCN). Nematode samples were collected at all locations in order to confirm that all fields has exceeded threshold levels of SCN at the time of planting. Currently the threshold level for soybean cyst nematode is 1 per pint of soil. Nematode sampling and yield were collected at each location at the end of each growing season to determine the effectiveness of the seed treatments evaluated.

Table 1: Yield averages for each seed treatment evaluated during the 2015, 2016, and 2017 growing seasons.

Treatment	Soybean Yield (bu/ac)
CruiserMaxx + Vibrance	29.6
Clariva Complete	29.2
iLevo	29.1
Aveo	31.5

Results: Data combined across 2015, 2016 and 2017 suggest that no yield benefit was observed with the addition of a nematicide seed treatment to soybean. It should be noted that soybean cyst nematode pressure through each field across each year was highly variable, thus the yield response to nematicide seed treatment could vary among different environments.

EVALUATION OF SOYBEAN GRAIN AND SEED QUALITY FOLLOWING HARVEST AID APPLICATION AND DELAYED HARVEST CONDITIONS (STUDENT PROJECT)

Purpose: To evaluate yield as well as seed and grain quality as it relates to delayed harvest conditions for soybean after a harvest aid is applied.

Procedure: Experiments were conducted in 2019 at the R.R. Foil Plant Science Research Center near Starkville, MS. Treatments were arranged in a randomized complete block design with Factor A consisting of 4 harvest intervals and Factor B consisting of 3 harvest aid products. The 4 harvest intervals start with being harvested on time (0) and 2, 4, and 6 weeks after the initial harvest date. The 3 harvest aid products were applied at the R7 growth stage and included Gramoxone SL 2.0 (paraquat), Defol 5 (sodium chlorate), or a tankmix of Gramoxone SL 2.0 plus Defol 5 (paraquat + sodium chlorate) with an untreated treatment included with each harvest aid product and harvest delay combination for comparison purposes. All treatments were replicated four times. Data collected included seed quality, grain quality, and overall grain yield. Seed quality data consisted of germination tests. Grain quality analysis of samples collected at harvest were performed at a USDA certified grading facility.

Figure 1. Soybean grain quality averaged across harvest aid products.

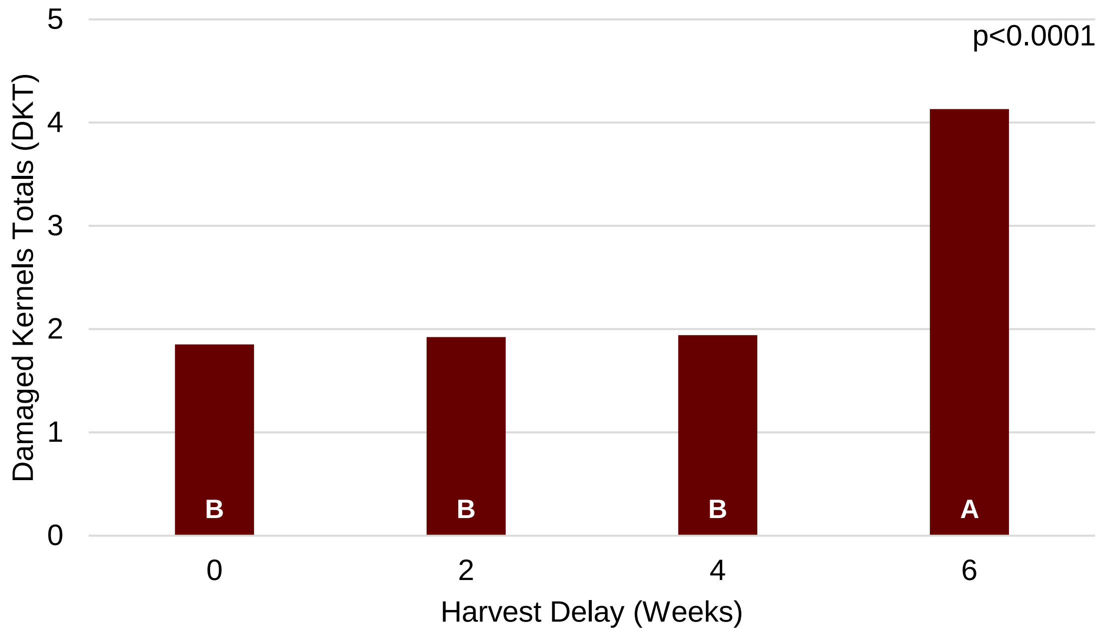


Figure 2. Soybean seed quality averaged across each product as it relates to harvest delay.

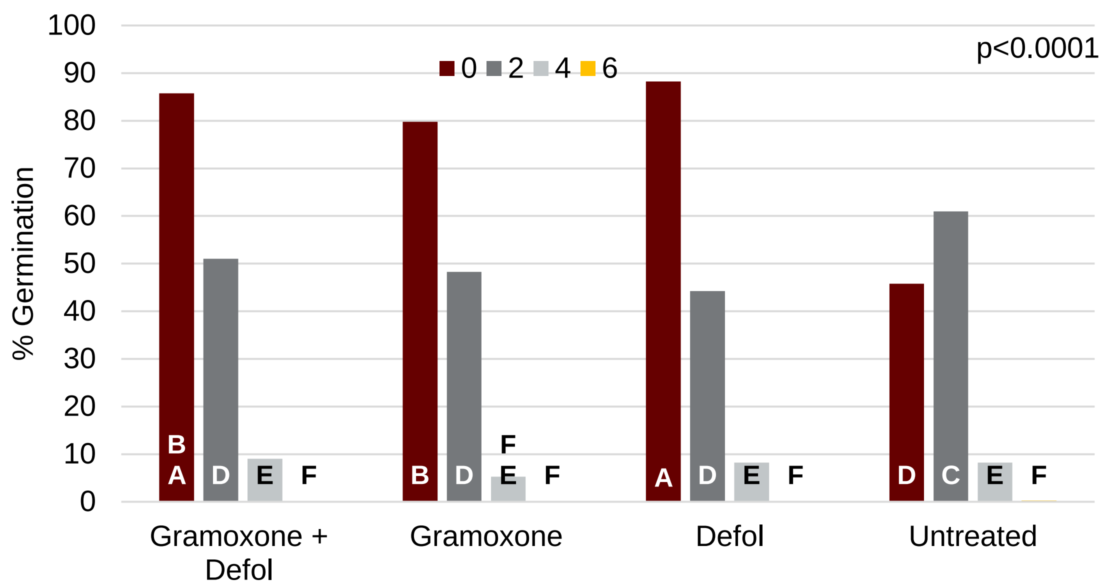
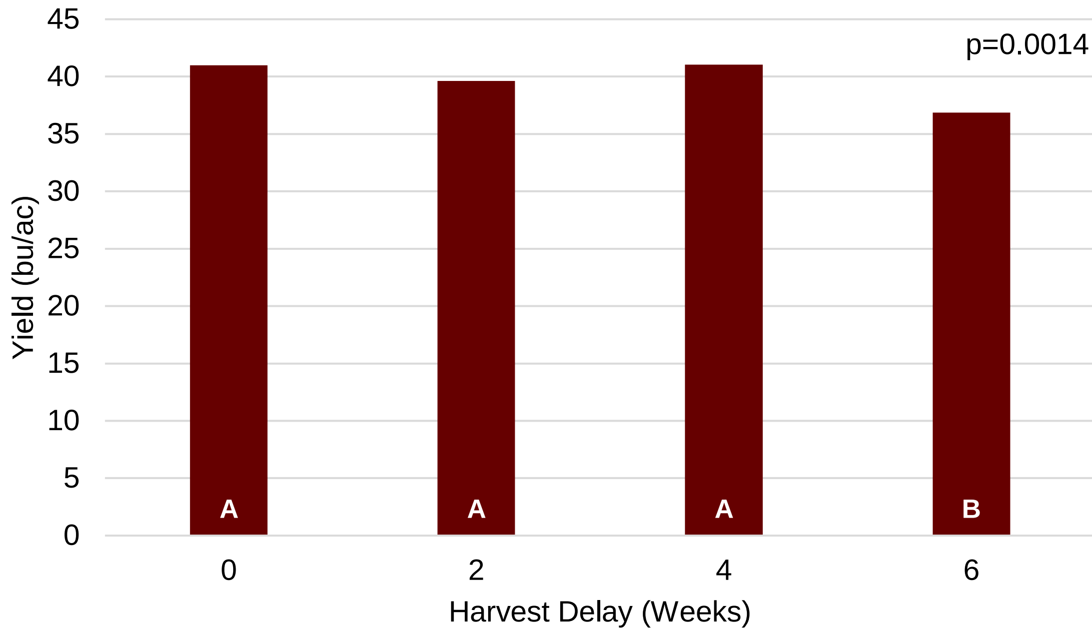


Figure 3. Soybean yield averaged across all harvest aid products.



Results: Preliminary results from 2019 indicate that soybean yield was impacted by both harvest aid treatment and harvest delay. A decrease in soybean yield was observed as harvest was delayed beyond 4 weeks past the initial harvest interval. Preliminary results suggest that harvest delay is linked to a decrease in grain quality as observed through grain quality analysis. Seed quality results indicate harvest delay combined with harvest aid treatments were significant as observed through seed quality analysis; a decrease in seed quality was observed across all harvest aid products as harvest was delayed. Adverse growing conditions could have affected the quality and yield results in the 2019 growing season. During this experiment, 2.5 inches of rainfall was received between initial harvest aid treatments and the 4 harvest delay. Additionally, 7.5 inches of rain occurred between the 4 and 6 week harvest delay intervals, likely contributing to the decrease in seed and grain quality and yield. Further trials will be conducted in 2020 growing season to evaluate soybean yield and quality responses to delayed harvest conditions following a harvest aid application.

EVALUATION OF SOYBEAN GRAIN AND SEED QUALITY FOLLOWING AUTOMATIC FUNGICIDE APPLICATION AND DELAYED HARVEST CONDITIONS (STUDENT PROJECT)

Purpose: To evaluate yield as well as seed and grain quality as it relates to delayed harvest conditions for soybean after a fungicide is applied.

Procedure: Experiments were conducted in 2019 at the R.R. Foil Plant Science Research Center near Starkville, MS. Treatments were arranged in a randomized complete block design with Factor A consisting of 4 harvest intervals and Factor B consisting of 3 fungicide products. The 4 harvest intervals start with being harvested on time (0) and 2, 4, and 6 weeks after the initial harvest date. The 3 fungicide products were applied at the R4 growth stage and included Quadris (Azoxystrobin), Miravis Top (Pydiflumetofen, Difenoconazole), and a tankmix of Priaxor plus Domark (Fluxapyroxad, Pyraclostrobin + Tetraconazole) with an untreated treatment included with each fungicide product and harvest delay combination for comparison purposes. All treatments were replicated four times. Data collected included seed quality, grain quality, and overall grain yield. Seed quality data consisted of germination tests. Grain quality analysis from samples collected at harvest were performed at a USDA certified grading facility.

Figure 1. Soybean grain quality averaged across all fungicide products.

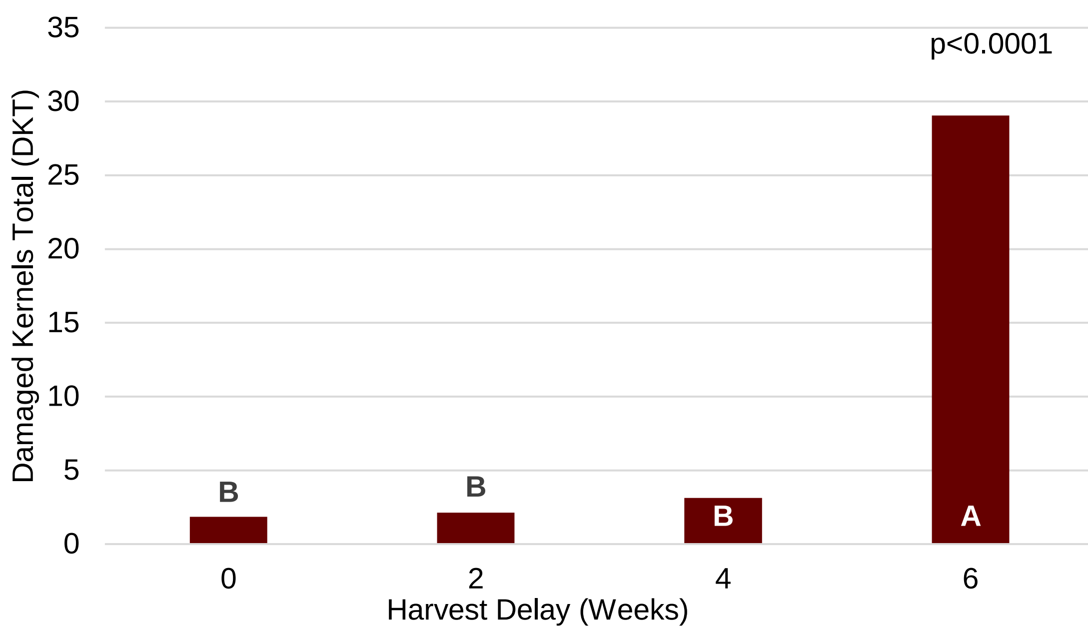


Figure 2. Soybean seed quality averaged across all fungicide products.

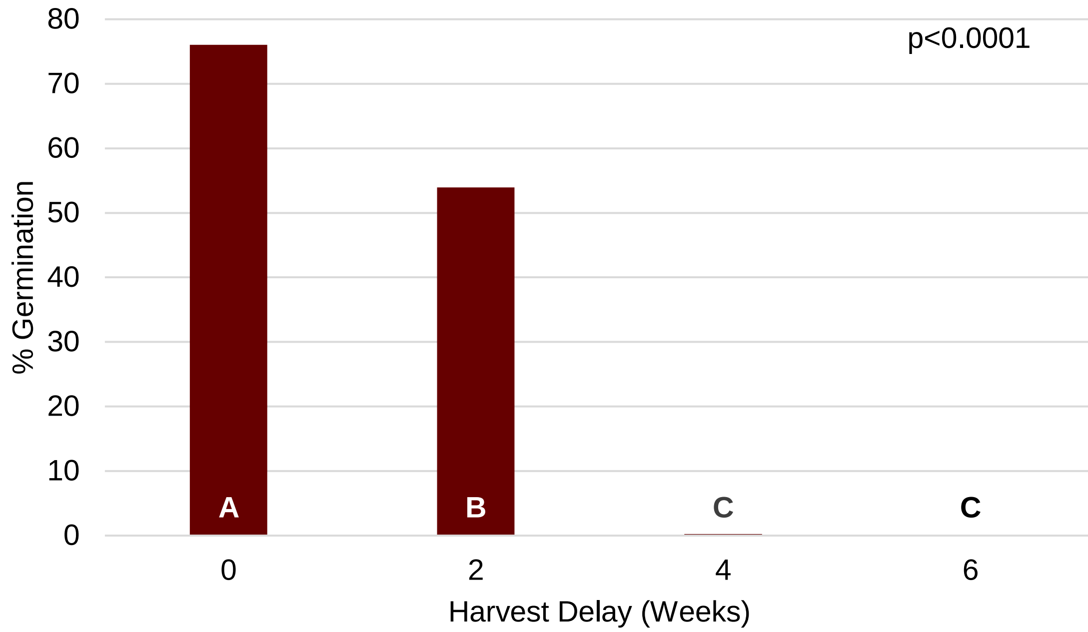
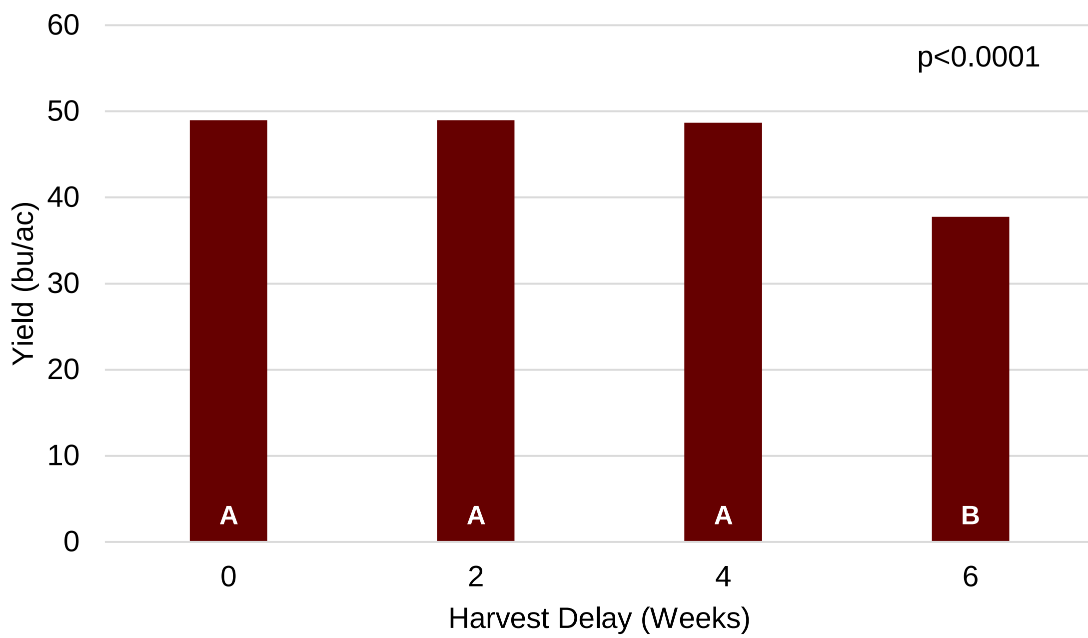


Figure 3. Soybean yield averaged across all fungicide products.



Results: Preliminary results from 2019 indicate that soybean yield was not impacted by fungicide treatment, but rather harvest delay. As harvest was delayed beyond the appropriate harvest time, a significant yield decrease was observed after 4 weeks delay. Preliminary results also suggest that harvest delay is linked to a decrease in grain quality as observed through grain quality analysis. Similarly, seed quality preliminary results suggest that harvest delay is linked to a decrease in grain quality as observed through seed quality analysis. Adverse growing conditions could have affected the quality and yield results in the 2019 growing season. During this experiment, 2.5 inches of rainfall was received between initial harvest aid treatments and the 4 weeks harvest delay interval. Additionally, 7.5 inches of rain occurred between the 4 and 6 week harvest intervals likely contributing to the decrease in seed/grain quality and yield. Further trials will be conducted in the 2020 growing season to evaluate soybean yield and quality responses to delayed harvest conditions following a fungicide application.

EVALUATION OF SOYBEAN GRAIN AND SEED QUALITY FOLLOWING FUNGICIDE PLUS HARVEST APPLICATION AND DELAYED HARVEST CONDITIONS (STUDENT PROJECT)

Purpose: To evaluate yield as well as seed and grain quality as it relates to delayed harvest conditions for soybean after a fungicide and harvest aid is applied.

Procedure: Experiments were conducted at two locations during the 2019 growing season. These locations were the R.R. Foil Plant Science Research Center near Starkville, MS and the Delta Research and Extension Center in Stoneville, MS. Treatments were arranged in a randomized complete block design with Factor A consisting of 4 harvest intervals and Factor B consisting of a fungicide product with a harvest aid product and a harvest aid alone. The 4 harvest intervals start with being harvested on time (0) and 2, 4, and 6 weeks after the initial harvest date. The fungicide product was applied at the R4 growth stage and consisted of Miravis Top (Pydiflumetofen, Difenoconazole) followed by a harvest aid product applied at R7 consisting of a tankmix of Gramoxone SL 2.0 plus Defol 5 (paraquat + sodium chlorate). An untreated treatment was included with each harvest delay and product combination for comparison purposes. All treatments were replicated four times. Data collected included seed quality, grain quality, and overall grain yield. Seed quality data consisted of germination tests. Grain quality analysis from samples collected at harvest were performed at a USDA certified grading facility.

Figure 1. Soybean grain quality averaged across products.

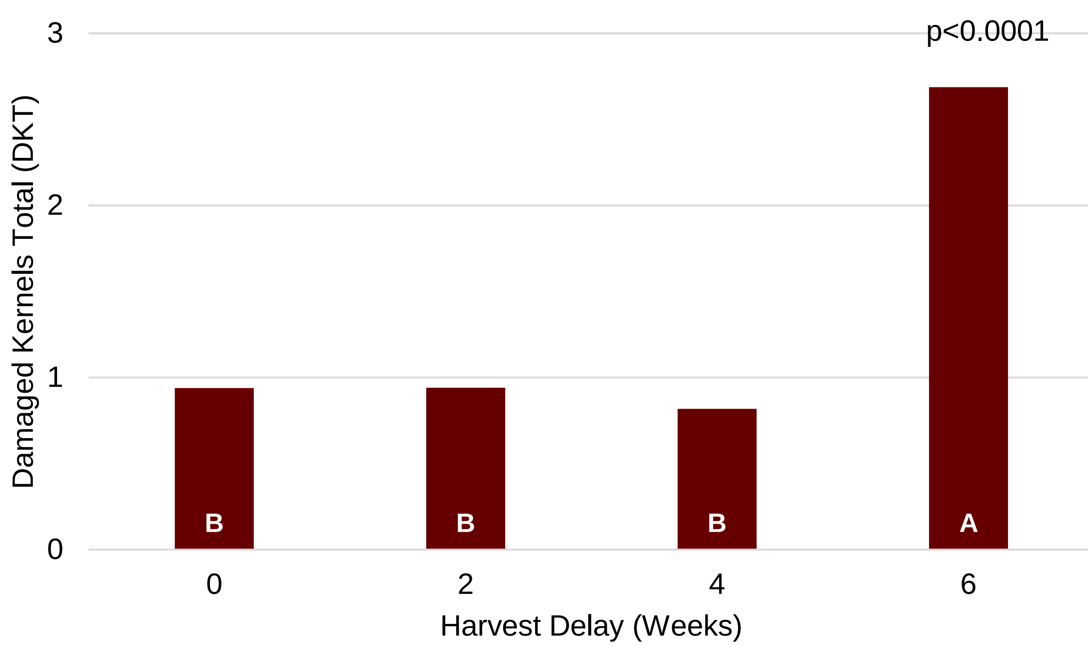


Figure 2. Soybean seed quality averaged across each product as it relates to harvest delay.

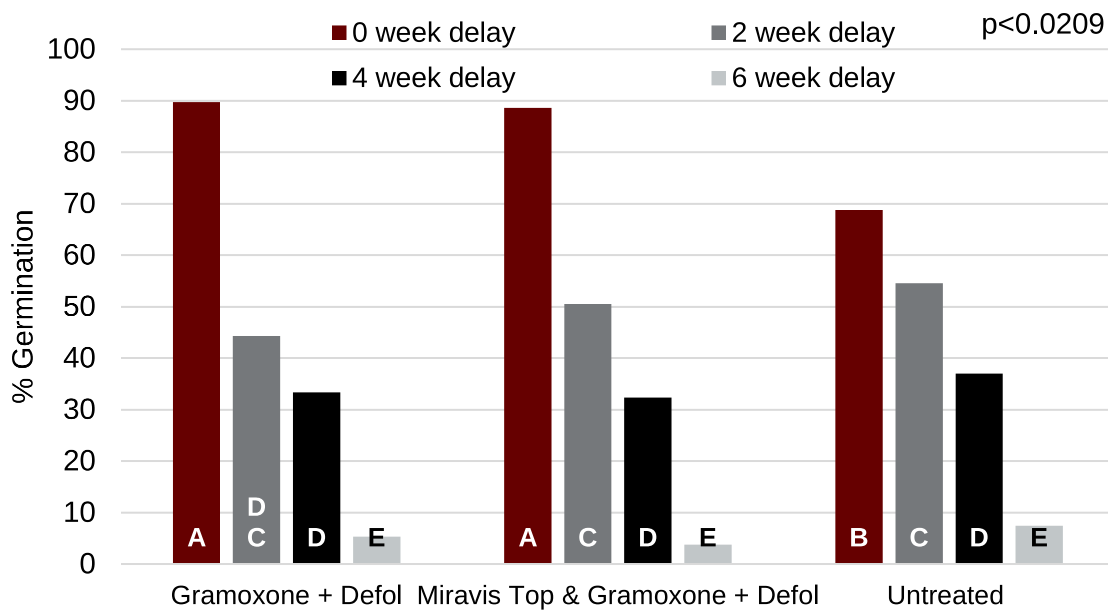
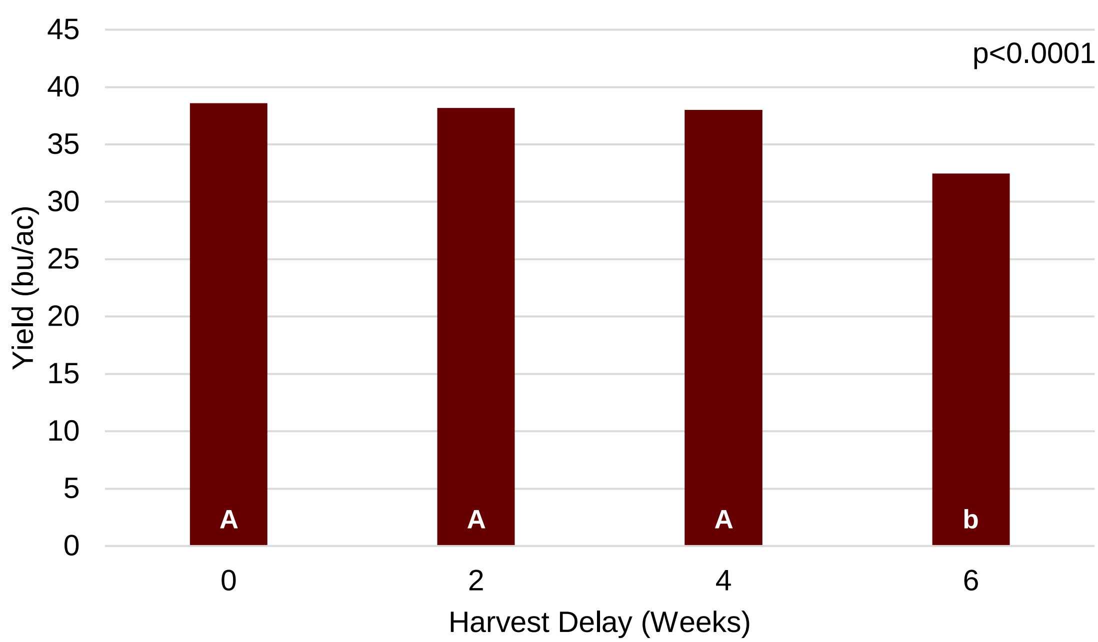


Figure 3. Soybean yield averaged across all products.



Results: Preliminary results from 2019 indicate that soybean yield was impacted by harvest delay. There was a significant decrease in yield when soybeans were under delayed harvest conditions for more than 4 weeks. Also, a significant decrease in yield was observed when treated with a harvest aid product and a fungicide product followed by a harvest aid product. The untreated check had significantly higher yields than soybean treated with harvest aid or fungicide followed by harvest aid product. Preliminary results also suggest that harvest delay is linked to a decrease in grain quality as observed through grain quality analysis. Seed quality preliminary results indicated harvest delay combined with fungicide and harvest aid treatments were significant as observed through seed germination tests. There is a significant decrease in seed quality across all products as harvest is delayed. Adverse harvest conditions could have affected the quality and yield results in the 2019 growing season. During this experiment, 7.5 inches of rain occurred between the 4 week and 6 week harvest intervals likely contributing to the decrease in seed/grain quality and yield. Further trials will be conducted in the 2020 growing season, to evaluate soybean yield and quality responses to delayed harvest conditions following a fungicide and/or a harvest aid application.

FUNGICIDE ON-FARM DEMONSTRATION TRIAL

Purpose: This demonstration was designed to evaluate the effect of fungicide application products and timing on soybean growth, development, and yield.

Procedure: Four fungicide treatments (TRTs) were applied in large field scale plots. These treatments are further explained in Table 1. This demonstration was conducted at four locations during the 2019 growing season: Lowndes County near Artesia, MS, Washington County near Greenville, MS, Bolivar County near Shaw, MS, and Bolivar County near Merigold, MS. All locations received applications by airplane at an application rate of 5 GPA. All locations, with the exception of the Artesia, MS location were conducted under irrigated conditions; the Artesia location was a rainfed environment. Final plant heights along with lodging, shattering, and green stem visual estimation scores were collected prior to harvest. Soybean yield was collected and measured in bushels per acre. Additionally, grain quality analysis from samples collected at harvest was performed by a USDA certified grain inspection facility to determine damaged kernels total (DKT) values.

Table 1: Fungicide application treatments.

TRT No.	Product	Application Timing	Application Rate
1	Miravis Top	R3/R4	13.7 fl. oz./acre
1	NIS	R3/R4	0.25 % V/V
2	Aproach Prima	R3/R4	6.8 fl. oz./acre
2	NIS	R3/R4	0.25% V/V
3	Magistrate	R3/R4	8 fl. oz./acre
3	NIS	R3/R4	0.25% V/V
4	Untreated Control		

Figure 1: Fungicide application trial layout.

Table 2: Plant height measurements along with lodging, shattering, and green stem scores[1]

UNTREATED	TRT 1	TRT 2	TRT 3
---------------------------------- Plant Height (in) ----------------------------------			
25.3	28.7	26.9	33.1
----------------------------------- Lodging (0-10) -----------------------------------			
3	3	3	2
---------------------------------- Shattering (0-10) ----------------------------------			
0	0	0	0
--------------------------------- Green Stem (0-10) ---------------------------------			
0	0	1	1

[1]Data collected is averaged across irrigated demonstration locations

Table 3: Plant height measurements along with lodging, shattering, and green stem scores[1]

UNTREATED	TRT 1	TRT 2	TRT 3
---------------------------------- Plant Height (in) ----------------------------------			
41.0	41.3	39.8	35.0
----------------------------------- Lodging (0-10) -----------------------------------			
4	4	4	6
---------------------------------- Shattering (0-10) ----------------------------------			
0	0	0	0
--------------------------------- Green Stem (0-10) ---------------------------------			
4	1	0	1

[1]Data collected is for the non-irrigated demonstration location

Figure 2: Yield differences among treatments averaged across all irrigated locations.

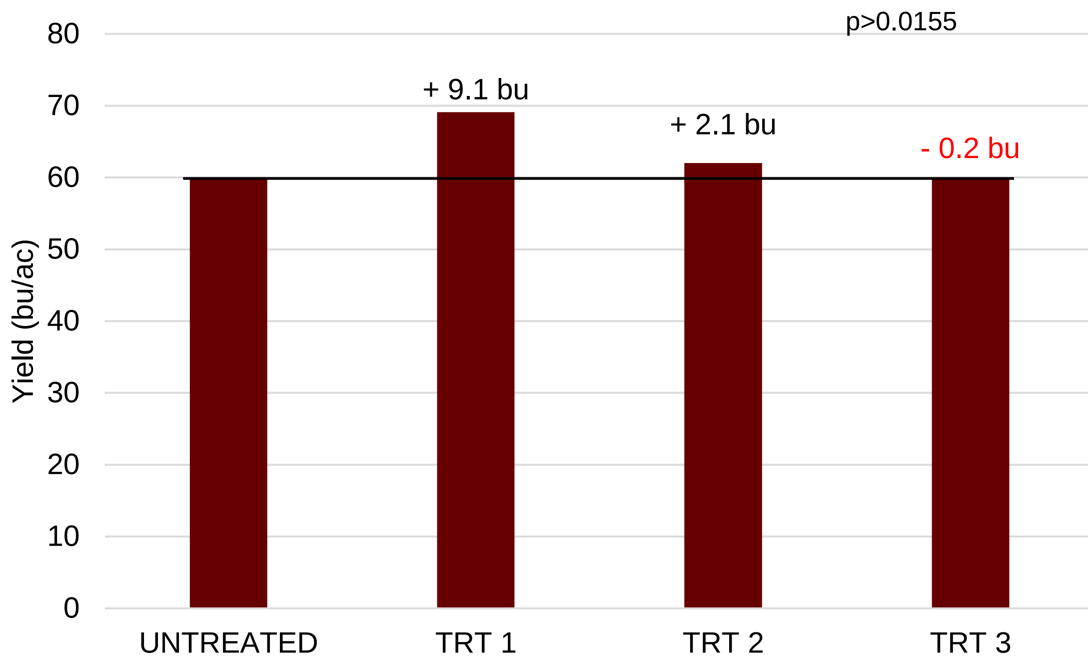
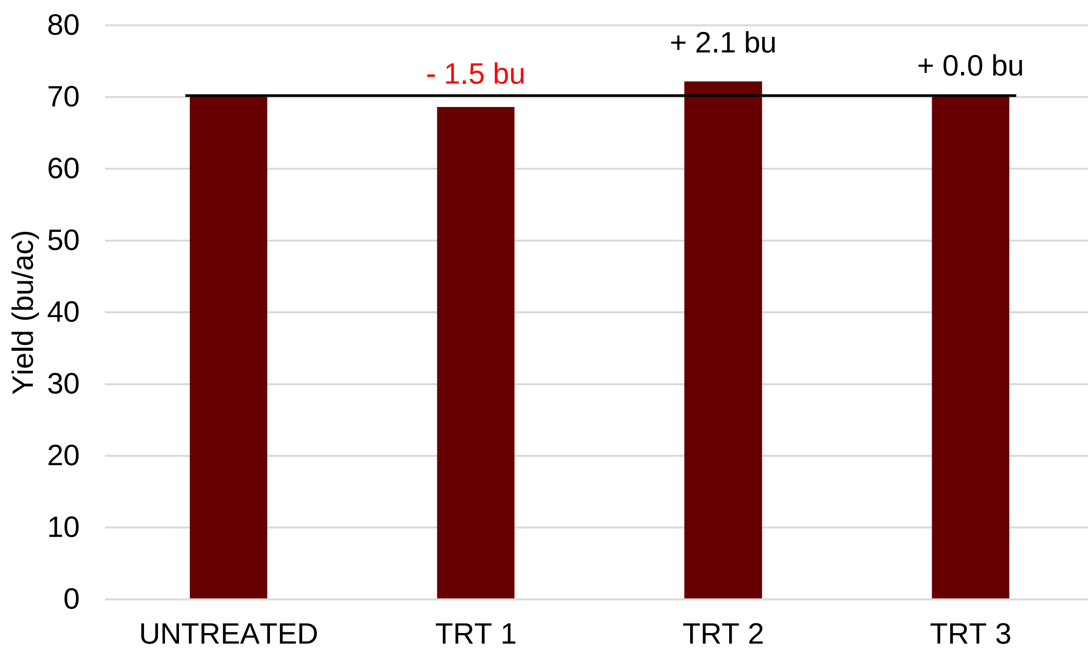


Figure 3: Yield differences among treatments for the non-irrigated location[1].



[1]Data not replicated, so no statistical analysis was preformed on this location

Table 4: Partial budget results for fungicide demonstration trial for irrigated locations.

Untreated	TRT 1	TRT 2	TRT 3
---------------------------------- $ product cost per treatment[1] -----------------------------------			
0.0	18.40	14.58	16.28
--------------------------- $ gross income (at $9.70/bu less discount) ---------------------------			
535.37	609.91	544.35	527.88
----------- $ net return above treatment cost (gross income – product cost) -----------			
535.37	591.51	529.77	527.88
----------------------------------- $ gain per acre over untreated -----------------------------------			
0.0	56.14	-5.61	-7.49

[1]Product costs were determined using the MSU Extension 2020 Soybean Planning Budget

Table 5: Partial budget results for fungicide demonstration trial for the non-irrigated location.

Untreated	TRT 1	TRT 2	TRT 3
---------------------------------- $ product cost per treatment[1] -----------------------------------			
0.0	18.40	14.58	16.28
--------------------------- $ gross income (at $9.70/bu less discount) ---------------------------			
618.28	605.05	636.80	618.28
----------- $ net return above treatment cost (gross income – product cost) -----------			
618.28	586.65	622.22	602.00
----------------------------------- $ gain per acre over untreated -----------------------------------			
0.0	-31.63	3.94	-16.28

[1]Product costs were determined using the MSU Extension 2020 Soybean Planning Budget

Results: Significant yield increases were observed at the irrigated locations (Figure 2). Since the non-irrigated location was a single location no statistical analysis was performed (Figure 3). Additionally, no differences were observed regarding plant height, lodging, shattering, and green stem scores (Tables 2 & 3). Economic gain was observed where Miravis Top was applied at irrigated locations (Table 4); while at the non-irrigated location, Aproach Prima resulted in an economic gain (Table 5). Grain quality analysis data showed no differences in DKT values, thus no dockage for poor seed quality was applied. One factor to consider is that the varieties planted in each of these fields contained excellent disease packages, which likely impacted the yield response of foliar fungicide applications.

IDC VARIETAL SCREENING
MATURITY GROUP IV (M.G. 4.5 – 4.6) RR2X

2019 Soybean Maturity Group IV (M.G. 4.5 – 4.6) RR2X
Variety Response to Iron Deficiency Chlorosis

Brand	Variety	IDC Tolerance Score[1]					Avg. IDC Tolerance Score
AgriGold	G4579RX	4	5	5	4	2	4
Pioneer	P46A57BX	4	5	5	3	2	4
Asgrow	AG46X0	4	5	5	4	3	4
MorSoy	MS 4616 RXT STS	5	5	5	4	2	4
Delta Grow	46X65 STS	5	5	5	4	3	4
Dyna-Gro	S46XS60	3	5	5	4	2	4
Great Heart	GT-4677XS	3	5	5	4	3	4
Delta Grow	46X25	5	6	6	5	3	5
Terral	REV 4679X	5	6	6	5	4	5
Local Seed	LS4565XS	5	7	7	5	4	5
Local Seed	LS4583X	6	6	6	5	3	5
Dyna-Gro	S45XS37	5	6	6	4	3	5
Dyna-Gro	S45XS66	5	6	6	4	3	5
Mission Seed	A4618X	5	6	6	4	3	5
AgriGold	G4605RX	5	6	6	5	3	5
Great Heart	GT-4616X	4	6	6	4	3	5
Local Seed	LS4677X	7	8	8	6	4	6
Asgrow	AG45X8	6	7	7	5	4	6
Asgrow	AG46X6	6	6	6	6	5	6
Progeny	P 4620 RXS	7	7	7	5	4	6

[1] Tolerance scores were assigned on a scale of 1 to 10 with 1 being completely tolerant and 10 being completely susceptible.

These data are intended to serve as an additional resource for variety selection specifically for soils with a history of problems associated with iron deficiency chlorosis. Consult other sources such as results from Official Variety Trials and Demonstration Programs for detailed information regarding variety performance.

IDC VARIETAL SCREENING
MATURITY GROUP IV (M.G. 4.7 – 4.9) RR2X

2019 Soybean Maturity Group IV (M.G. 4.7 – 4.9) RR2X
Variety Response to Iron Deficiency Chlorosis

Brand	Variety	IDC Tolerance Score[1]					Avg. IDC Tolerance Score
Don Mario	47X01	4	4	4	3	1	3
AGS	GS47X19	4	5	5	4	2	4
USG	7489XTS	4	6	6	4	3	4
Terral	REV 4927X	4	5	5	3	3	4
Dyna-Gro	S48XT56	3	5	5	4	2	4
MorSoy	MS 4846 RXT STS	5	6	6	4	2	4
Asgrow	AG48X9	4	5	5	4	2	4
NK	S47-Y9X	5	6	6	4	2	4
Great Heart	GT-4979X	5	6	6	4	2	4
Great Heart	GT-4802X	4	5	5	4	1	4
Local Seed	LSX4894X	4	5	5	4	2	4
Delta Grow	48X45	5	5	5	4	3	5
Delta Grow	49X15	5	6	6	5	4	5
AgriGold	G4815RX	5	6	6	4	3	5
LG Seeds	C4845RX	5	6	6	5	3	5
LG Seeds	LGS4899RX	5	6	6	4	3	5
AGS	GS49X19	6	7	7	5	3	5
USG	7470XTS	5	6	6	5	4	5
Pioneer	P48A60X	5	6	6	4	4	5
NK	S49-F5X	5	5	5	5	3	5
Dyna-Gro	S49XT70	6	6	6	5	3	5
Mission Seed	A4950X	5	6	6	4	2	5
Local Seed	LS4798X	5	6	6	4	3	5
Delta Grow	47X95 STS	6	6	6	5	3	5
Don Mario	49J3X	6	7	7	5	4	5
Progeny	P 4799 RXS	6	6	6	5	3	5
Progeny	P 4816 RX	5	6	6	5	3	5
Dyna-Gro	S47XT20	5	6	6	4	3	5
Credenz	CZ 4979X	6	6	6	5	4	5
Great Heart	GT-4764XS	5	6	6	5	2	5
Delta Grow	48X05	5	6	6	4	3	5
LG Seeds	LGS4931RX	6	7	7	6	5	6
USG	7496XTS	7	7	7	6	6	6
Local Seed	LS4889XS	6	7	7	6	4	6
Dyna-Gro	S49XT39	7	7	7	6	5	6
Asgrow	AG47X9	6	7	7	5	4	6
Asgrow	AG49X9	6	7	7	6	5	6
Progeny	P 4821 RX	6	7	7	6	5	6
Terral	REV 4940X	6	7	7	6	6	6
Great Heart	GT-4833XS	5	7	7	5	4	6
Progeny	P 4851 RX	7	8	8	7	6	7
Progeny	P 4999 RX	7	7	7	6	6	7
Credenz	CZ 4869X	7	7	7	7	6	7

[1] Tolerance scores were assigned on a scale of 1 to 10 with 1 being completely tolerant and 10 being completely susceptible.

These data are intended to serve as an additional resource for variety selection specifically for soils with a history of problems associated with iron deficiency chlorosis. Consult other sources such as results from Official Variety Trials and Demonstration Programs for detailed information regarding variety performance.

IDC VARIETAL SCREENING
MATURITY GROUP V RR2X

2019 Soybean Maturity Group V RR2X
Variety Response to Iron Deficiency Chlorosis

Brand	Variety	IDC Tolerance Score[1]					Avg. IDC Tolerance Score
Dyna-Gro	S52XT08	3	5	5	4	1	3
Dyna-Gro	S54XT17	3	4	4	3	2	3
NK	S53-F7X	4	5	5	3	2	3
Armor	51-D77	4	5	5	4	2	4
Asgrow	AG55X7	4	4	4	4	2	4
Credenz	CZ 5299X	4	5	5	4	4	4
Delta Grow	52X05	4	5	5	4	2	4
Delta Grow	54X25	3	5	5	4	2	4
Dyna-Gro	S52SX39	4	5	5	4	2	4
Dyna-Gro	S56XT99	4	5	5	4	3	4
Great Heart	GT-5528X	4	6	6	4	3	4
Local Seed	LS5087X	5	5	5	4	2	4
Local Seed	LS5588X	5	5	5	4	2	4
Pioneer	P54A54X	5	5	5	4	2	4
Progeny	P 5252 RX	4	5	5	4	3	4
Progeny	P 5688 RX	4	5	5	5	3	4
Terral	REV 5659X	4	5	5	4	2	4
Local Seed	LS5386X	6	5	5	5	3	5
Progeny	P 5554 RX	4	5	5	5	4	5
Armor	52-D71	6	7	7	6	4	6
Progeny	P 5170 RX	6	6	6	6	4	6
AgriGold	G5000RX	7	8	8	7	7	7
Asgrow	AG52X9	7	7	7	7	5	7
NK	S51-R3XS	8	8	8	7	7	7
Progeny	P 5016 RXS	8	7	7	7	6	7
Asgrow	AG53X10	8	8	8	8	7	8
Asgrow	AG53X9	8	8	8	8	8	8

[1] Tolerance scores were assigned on a scale of 1 to 10 with 1 being completely tolerant and 10 being completely susceptible.

These data are intended to serve as an additional resource for variety selection specifically for soils with a history of problems associated with iron deficiency chlorosis. Consult other sources such as results from Official Variety Trials and Demonstration Programs for detailed information regarding variety performance.

IDC VARIETAL SCREENING
MATURITY GROUP IV RR / RR2 / Enlist E3

2019 Soybean Maturity Group IV RR / RR2 / Enlist E3
Variety Response to Iron Deficiency Chlorosis

Brand	Variety	IDC Tolerance Score[1]					Avg. IDC Tolerance Score
Delta Grow	DG 48E10	4	4	3	3	3	3
Delta Grow	DG 48E28	4	4	4	3	2	4
Don Mario	48D3E	4	4	5	3	2	4
GoSoy	463E19	4	4	4	4	2	4
USG	7480ET	4	4	4	4	2	4
Delta Grow	DG 46E29 STS	5	5	4	4	3	5
Uni. of Missouri	S14-15138	4	4	6	4	3	5
Delta Grow	DG 47E25	5	5	6	5	3	5
Delta Grow	DG 48E39	7	7	7	6	5	5
Delta Grow	DG 49E29 STS	5	5	5	6	3	5
Delta Grow	DG 47E19	7	7	7	7	5	5
Uni. of Missouri	S14-15146	7	7	8	7	6	5
Petrus Seed	4916 GT	7	7	7	6	5	6
GoSoy	482E18	7	7	6	6	4	6
Delta Grow	DG 48E49 STS	7	7	7	7	6	6

[1] Tolerance scores were assigned on a scale of 1 to 10 with 1 being completely tolerant and 10 being completely susceptible.

These data are intended to serve as an additional resource for variety selection specifically for soils with a history of problems associated with iron deficiency chlorosis. Consult other sources such as results from Official Variety Trials and Demonstration Programs for detailed information regarding variety performance.

IDC VARIETAL SCREENING
MATURITY GROUP VRR / RR2 / Enlist E3

MISSISSIPPI STATE UNIVERSITY EXTENSION

2019 Soybean Maturity Group V RR / RR2 / Enlist E3 Variety Response to Iron Deficiency Chlorosis

MSPB

Brand	Variety	IDC Tolerance Score[1]					Avg. IDC Tolerance Score
Delta Grow	DG 5585 RR2 STS	3	4	4	3	2	3
Uni. of Missouri	S16-3747RY	4	4	4	3	3	4
Go Soy	50G17	5	5	5	4	3	4
Delta Grow	52E22	7	8	8	8	7	7
Go Soy	512E18	7	8	8	7	7	7
Uni. of Missouri	S14-9017	8	8	8	8	8	8

[1] Tolerance scores were assigned on a scale of 1 to 10 with 1 being completely tolerant and 10 being completely susceptible.

These data are intended to serve as an additional resource for variety selection specifically for soils with a history of problems associated with iron deficiency chlorosis. Consult other sources such as results from Official Variety Trials and Demonstration Programs for detailed information regarding variety performance.

SEED QUALITY RESULTS FOR MG IV (CLAY SOIL) VARIETIES RR2X FROM THE 2019 ON-FARM VARIETY DEMONSTRATION

Soybean Seed Quality Results for MG IV (Clay Soil) RR2X Varieties from the 2019 On-Farm Variety Demonstration

Brand	Variety	Damaged Kernels Total (DKT) Score by Individual County Location							Overall DKT[3] AVG
		Clay 05-20-2019[1] 10-03-2019[2]	Humphreys 06-04-2019 10-10-2019	Leflore 05-01-2019 09-16-2019	Leflore 06-13-2019 11-05-2019	Noxubee 05-08-2019 09-23-2019	Tunica 06-14-2019 11-14-2019	Washington 05-31-2019 10-03-2019	
AGS	AGS GS49X19	1.1	0.5	0.3	2.5	-	0.6	0.3	0.8
Armor	49-D66	1.1	0.5	0.2	2.7	0.2	0.7	0.1	0.8
Armor	X49-D67	0.7	-	0.2	3.1	0.4	0.3	0.1	0.8
Asgrow	AG45X8	0.7	1.4	1.0	4.8	0.7	0.6	0.2	1.3
Asgrow	AG46X6	0.6	1.2	0.7	-	0.3	1.4	0.2	1.1
Asgrow	AG48X9	0.3	0.9	0.3	3.5	0.4	0.5	0.2	0.9
Credenz	CZ 4979X	0.2	0.3	0.4	3.7	0.5	0.6	0.1	0.8
Delta Grow	DG 48X45 RR2X	0.3	1.3	0.2	2.9	0.3	0.7	0.2	0.8
Dyna-Gro	S45XS66	0.7	0.7	0.4	1.8	1.3	1.2	0.2	0.9
Local Seed	LSX4798X	0.9	1.1	0.6	2.5	0.4	1.1	0.2	1.0
NK	S49-F5X	0.2	-	0.1	3.0	0.7	0.6	0.1	0.8
Progeny	P 4821 RX	1.4	0.1	0.6	-	0.4	0.8	0.1	0.9
Progeny	P 4851 RX	0.8	0.6	0.1	2.5	0.5	0.9	0.3	0.8
Terral	REV 4927X	0.8	0.5	0.3	2.6	0.2	0.9	0.1	0.8
Terral	REV 4940X	0.5	0.6	0.3	2.8	1.1	0.9	0.6	1.0

[1]Planting Date
[2]Harvest Date
[3]DKT scores were analyzed in SAS 9.4, average scores were found to not be significantly different across the varieties that were evaluated ($\alpha = 0.3916$).
DKT scores were determined by Mid-South Grain Inspection Services, which is an official USDA designated grain inspector agency.

SOYBEAN SEED QUALITY RESULTS FOR MG V VARETIES RR2X FROM THE 2019 ON-FARM VARIETY DEMONSTRATION

Soybean Seed Quality Results for MG V RR2X Varieties from the 2019 On-Farm Variety Demonstration

Brand	Variety	Damaged Kernels Total (DKT) Score by Individual County Location					Overall DKT[3] AVG
		Clay 05-20-2019[1] 10-03-2019[2]	Lowndes 05-22-2019 10-01-2019	Madison 05-22-2019 10-02-2019	Monroe 06-13-2019 11-11-2019	Noxubee 05-08-2019 9-23-2019	
AGS	AGS GS52X19S	0.6	0.1	0.1	7.2	0.3	1.7
Armor	51-D77	0.5	0.2	0.3	16.8	0.9	3.7
Armor	52-D71	-	0.3	0.4	9.6	1.2	2.5
Asgrow	AG52X9	0.4	0.4	0.5	13.8	0.2	3.1
Asgrow	AG53X9	0.9	0.5	0.2	9.7	0.4	2.3
Credenz	CZ 5299X	0.8	0.1	1.0	-	1.3	2.4
Delta Grow	DG 54X25 RR2X	0.5	0.3	0.4	7.4	0.4	1.8
Dyna-Gro	S56XT99	1.0	0.1	0.1	6.8	0.2	1.6
Local Seed	LS5087X	0.5	0.3	0.3	7.5	0.2	1.8
NK	S53-F7Z	0.9	0.3	0.3	10.6	0.6	2.5
Pioneer	P54A54X	0.5	0.1	0.3	8.1	0.4	1.9
Pioneer	P55A49X	0.8	-	0.3	3.0	0.6	0.7
Progeny	P 5252 RX	1.1	0.2	0.2	-	0.6	2.1
Progeny	P 5688 RX	0.3	0.1	1.3	6.7	0.4	1.8
Terral	REV 5659X	0.3	0.1	0.4	3.1	1.2	1.0

[1]Planting Date

[2]Harvest Date

[3]DKT scores were analyzed in SAS 9.4, average scores were found to not be significantly different across the varieties that were evaluated (α = 0.4684). DKT scores were determined by Mid-South Grain Inspection Services, which is an official USDA designated grain inspector agency.

Attach 2019 VARIETY DEMO SUMMARY HERE