2008 Research Report To The
2009 Grain Crops Producer Advisory Committee
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I. Soybean

1) **Roundup Ready soybean variety trials:**
   a. **Leeper silty clay loam soil, Verona (Buehring, NMREC; White, MAFES Variety Evaluation):** Two hundred and eighteen varieties (MG III, early MG IV and V, and late MG IV and V) were evaluated. The highest yield varieties across maturity groups ranged from 59 to 74 bu/ac. The lowest yield varieties across maturity groups ranged from 33 to 45 bu/ac. **Data is available at: www.msucares.com/nmrec/publications/soybean_variety_trial_report 2008.pdf**
   b. **Brooksville silty clay loam soil, Brooksville (White, MAFES Variety Evaluation):** Two hundred forty-four Roundup Ready varieties (MG III, early MG IV and V, and late MG IV and V) were evaluated. The highest yield varieties across maturity groups ranged from 29 to 61 bu/ac. The lowest yield varieties across maturity groups ranged from 18 to 49 bu/ac. **Data is available at: www.msucares.com/pubs/infobulletins/ib0446.pdf**
   c. **2009 Suggested Soybean Variety List is available at: www.msucares.com/crops/soybeans/variety-list09.pdf**

2) **Soybean Maturity Group Variety Yield Response to Seeding Rates:**
A study in 2004-2006 evaluated productive MG IV and V soybean varieties growth and yield response to seeding rates (60,000, 90,000, 120,000, and 150,000 seed/ac). The varieties were planted in 15-inch rows with a vacuum planter in late April of each year with optimum soil-planting conditions. Rainfall for all 3 years was erratic with extended dry periods for the month of August. The 3-year average yields for 90,000 seed/ac (76,200 plants/ac), 120,000 seed/ac (97,300 plants/ac), and 150,000 seed/ac (115,500 plants/ac) ranged from 49 to 50 bu/ac. These yields were significantly greater than 47 bu/ac for the 60,000 seed/ac (51,800 plants/ac). These results indicate using vacuum planters equipped with uniform seed depth control and good seed slit closure in combination with good-quality soybean planting seed, seeding rates can be reduced to about 100,000 seed/ac in a non-crusting soil environment.
Acknowledgement: This research in part was supported by the Mississippi Soybean Promotion Board Producer Check-Off Program.

3) **Soybean maturity group response to insecticide-fungicide seed treatment early planting dates (Buehring and Cook, NMREC; Catchot, MSU-EPP; Poston and Gore, DREC)**: Commonly grown productive Roundup Ready soybean varieties of Maturity Group (MG) IIII, (AG3906); early MG IV (Asgrow AG4403); late MG IV (Pioneer 94B73); early MG V (Deltapine DP5115RR); and late MG V (Deltapine DP5634) with seed treatments Apron and Apron + Cruiser were planted April 15, May 15 and June 15 in 2008 at Verona, Starkville and Stoneville. Due to weather related poor stinkbug control and low yield, the Starkville data was not included in the yield analysis. Seed treatment had no effect on plant populations. Although bean leaf beetle defoliation was less than 10% across all varieties and planting dates, the defoliation was higher with the Apron seed treatment than the Apron + Cruiser seed treatment. Thrip damage (only observed at Stoneville) indicated the Apron treatment also showed more damage than Apron + Cruiser. Averaged across locations, varieties and planting dates, the Apron + Cruiser seed treatment plots produced 2.4 bu/ac more yield than the Apron seed treatment plots. The Apron ($4/bu) + Cruiser ($8/ac) seed treatment cost of $12/ac for a 50 lb/ac seeding rate was obtained from a local vendor. Using estimated grain market prices of $6, $7 and $8/bu for soybean, the returns above the $8/ac cost for the Cruiser portion of the seed treatment cost was $6, $9 and $11/ac, respectively.
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4) **Impact of starter fertilizer on soybean growth and yield planted in April and early May, Blessit, DREC; Buehring, NMREC):** A study initiated in 2007 evaluated a late Maturity Group IV soybean variety response to starter fertilizer applied at planting on April 1 and May 1 on a silty clay loam soil at Verona and on four soil types at Stoneville: one sandy loam, one mixed soil, and two heavy clays. The two-year results with starter fertilizers [urea, ammonium nitrate, ammonium sulfate (AMS), diammonium phosphate, and sulfur] indicated no differences between any fertilizer amendment and the non-treated control, except for one instance where sulfur was deficient. In this instance, AMS and elemental sulfur improved yields and AMS out yielded the sulfur plots. Planting dates indicated a greater yield potential in April plantings each year at Stoneville.

   However, in a non-irrigated environment at Verona, the 2007 April planting produced higher yield than May planted. While the May planting in 2008 produced higher yield than the April planting. The rainfall events were more yield favorable for the April than May planting in 2007 and more favorable for the May than April planting in 2008.

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5) **Statewide MG IV and MG V Soybean Fungicide Studies (Blessit DREC; Buehring, NMREC):** Highest yields occurred with fungicide programs that included full rates of the strobulin fungicides Quadris or Headline. In the majority of locations (2005-2008), Stratego, a strobulin/triazole premix, also offered a yield enhancement. Yield increases with these programs ranged from 3 to 5 bu/ac. Yields with reduced rate programs tended to be lower than with full rate programs.
   - In the absence of rust, there was no benefit to a second application. In the instance there was benefit, that yield response was not economical.
   - Domark was the only triazole fungicide evaluated across locations that increased yields above the non-treated control, but yields were not equal to the best treatments.
   - Striking differences in percent spray coverage were observed in studies where various nozzle types and spray volumes were utilized. However, no significant differences in efficacy or yield response were recorded. This was likely due to limited disease pressure. These findings will likely change under heavy disease pressure and when rust is present.
   - In the absence of soybean rust, R3 to 4 still appears to be the most optimal timing to apply strobulin-based fungicide treatments.
   - The addition of adjuvants to Quadris treatments increased the level of disease control. Disease control with Headline and Quilt were not improved with the addition of adjuvants.
   - The triazole fungicide Topguard was evaluated a second year and both disease control and yield responses looked promising.

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6) **Long-term Quadris-based Research (Blessit, DREC; Buehring, NMREC):**
   - 6.2 oz/ac of Quadris alone or in combination with other products increased yields 4.2 to 5.1 bu/ac on average.
   - Averaged across timings and locations, Quadris at 6.2 oz/ac and Quadris at 6.2 oz/ac + Dimilin at 2 oz/ac increased net returns $9.57 and $12.49/ac, respectively.
   - Soybean yields were 2.2 bu/ac higher with applications made at R3 to 4 growth stage compared to the applications made at the R5 to 6 growth stages.
   - Yield increases were attributed to increases in seed size. Increases in pod number also occurred at some locations with R3 to 4 applications.
   - Fungicides tended to increase plant greening at some locations, which will likely increase the need to use harvest aides.

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II. Corn

1) **Corn hybrid trials (Bernie White, MAFES Variety Evaluations)**:
   a. Chris Ausborn Farm, Aberdeen (Houston clay soil): Seventy-seven hybrids were evaluated. Yields ranged from 95 to 169 bu/ac. **Data is available at: www.msucares.com/pubs/infobulletins/ib0445.pdf**
   b. Blackbelt Branch Station, Brooksville (Brooksville silty clay loam soil): Seventy-seven hybrids were evaluated. Yields ranged from 72 to 125 bu/ac. **Data is available at www.msucares.com/pub/infobulletins/ib0445.pdf**
   c. 2009 MSU corn hybrid suggestions short list is available at: www.msucares.com/crops/corn/pdf_files/short-list09.pdf
2) **Statewide corn fungicide trials (Buehring, NMREC; Larson, MSU-PSS; Allen, DREC; Henn, MSU-EPP; Ingram, CMREC)**: Both years (2007 and 2008) statewide foliar fungicide studies in both irrigated and non-irrigated environments indicated no diseases were present and there was no yield response to Headline, PropiMax or Quilt (2008) applied at tassel. Visual observations and SPAD chlorophyll meter and stalk strength meter readings indicated no fungicide stay-green or stalk strength effect.

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3) **Corn N rate and time of sidedress application study(Buehring, NMREC):** This study was initiated in 2008 to evaluate N rates applied in-furrow, preplant sidedress plus sidedress, only preplant sidedress and sidedress only at 5 to 7 leaf corn, about 4 weeks after planting.

- In-furrow starter fertilizer [10-34-0 and 10-20-5 (+1% S + 1% Zn); N-P-K] + sidedress N at 120 and 180 lb N/ac applications did not improve yield compared to sidedress N without in-furrow starter fertilizer.
- The 160 lb N/ac sprayed on the soil surface one week after corn emergence produced yields equal all N applied preplant sidedress plus sidedress or sidedress only. The success of this method of N application was probably related to the mild (72ºF), and mostly cloudy weather at application followed by 1.1 inches rainfall one day after application.
- The 169 bu/ac yield for the 200 lb N/ac rate (⅓ N applied preplant followed by Fb ⅔ N sidedress) applied with the colter-knife system four weeks after planting was equal to the 240 lb N/ac rate (⅓ N applied preplant sidedress (Fb) ⅔ N applied sidedress). The yield for the 200 lb N/ac rate with ⅓ N applied preplant Fb ⅔ N sidedress, was higher than ½ preplant Fb ½ sidedress, ⅔ preplant Fb ⅓ sidedress, all applied preplant, or all N applied sidedress 4 weeks after planting. The 200 lb N (⅓ preplant Fb ⅔ sidedress) yield also was higher than the 120 lb N and 160 lb N rates with all N application timings.

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III. Corn/soybean rotation and tillage

1) **Eight-year (2001-2008) Prairie clay soil rotation and tillage study (Buehring, NMREC):**
   a) **Corn**: the 8-year average yield for no-till following soybean in an every other year corn-soybean rotation was a 22 bu/ac (18%) higher than continuous no-till corn. Yield for no-till corn following the fall chisel-harrow (FCH) (one-pass tillage operation) soybean system was 26 bu/ac (21%) higher than continuous no-till corn.
   b) **Soybean:** the 8-year average yield for no-till soybean following no-till corn in an every other year corn-soybean rotation was 5 bu/ac (12%) more than continous no-till soybean. The 8-year average FCH (one-pass tillage system) soybean following no-till corn in a rotation showed 4 bu/ac (9%) higher yield than no-till soybean following no-till corn, and 9 bu/ac (24%) higher than continuous no-till soybean.

IV. Corn-soybean rotation bed height and bed longevity (Buehring, NMREC):

Since drainage is critical, especially on flat bottomland soils, a study was initiated in 2006 to evaluate bed height and duration [with and without under-row-deep tillage (Paratill)] effect on corn and soybean yield in a rotation.

Corn: All bed heights (after initial bed formation in the fall of 2005), with and without under-row-deep tillage (Paratill), produced a 3-year average of 6 to 14 bu/ac higher yield than continuous no-till. Deep under-row tillage (Paratill) + bed-roller, showed no yield advantage over the bed-roller alone. The 8 to 9-inch beds formed in the fall of 2005 produced a 3-year average yield of 129.5 bu/ac and were 11 bu/ac more than continuous no-till. But it was not different from Paratill + bed roller, and the 5 to 6-inch or 10 to 11-inch beds formed in the fall of 2005. The data thus far indicates that one can plant no-till on old 8 to 9-inch beds (formed in 2005) through at least 3 cropping seasons without a yield reduction.

Soybean: Soybean yields indicated less yield response to raised beds than corn. The no-till 3-year average yield of 44.7 bu/ac was only lower than the 8 to 9-inch beds that were bedded annually or with a Paratill + bed roller (8 to 9-inch beds) done annually. However, the 5 to 6-inch beds formed in the fall of 2005 showed a numerical 6% higher yield than continuous no-till. The fall 2008 bed height measurements (after harvest) indicated the 5 to 6 and 8 to 9-inch bed heights formed in 2005 were 2.8 and 3.6 inches tall, respectively, with no differences in height between 8 to 9-inch and 10 to 11-inch bed heights.