Double -Crop Community Meeting – Notes

Mississippi River Delta, Jeremy Ross, University of Arkansas

• Wheat prices drives wheat acreage and double crop acres
• Drop in wheat prices have led to a decline in double crop soybean acres
• There is increasing interest in cover crops which may be increasing interest in wheat as a cash cover crop
• There is more interest now in keeping residue and building organic and a decline in burning residue
• Growers are asking for and learning to look for the best soybean double crop variety
• Growers are plating mid Group IV varieties for full season and double crop soybeans
• Increase seeding rate 10-15% and plant in narrow rows
• Fall application of P and K with wheat is okay if soil test levels on medium to high, spring application before planting double crop soybeans if soil test levels are low
• After May 15, inoculant soybeans, full or double crop soybeans
• Implement a comprehensive seed control program with residual, multiple modes of action and the Liberty Link trait
• Insecticides – apply 1-2x for full season soybeans, 2-3x for double crop soybeans, scout
• Host of diseases so you a fungicide as needed

Mississippi River Delta - Region Description

The area known as the Mississippi River Delta Region includes portions of Arkansas, Louisiana, Mississippi, Missouri, and Tennessee, and has been known for being the center of cotton and rice production in the past. Row-crop production in this Region accounts for roughly 14 million planted acres with a diverse mix of corn, cotton, rice, soybean, and winter wheat. Double crop soybean acreage peaked in this Region during the 1980’s accounting for approximately 30% of the total soybean acreage, and has continued to decline to less than 10% of the current soybean acreage. However, with producers looking at diversifying commodities, there is greater potential to increase the number of double-crop soybean acres in the Mississippi River Delta Region.

Soybean yields in the Mississippi River Delta Region have gradually been increasing over the past several years, mainly due to improved genetics, increased in-field scouting for damaging pest, and increased irrigation efficiency. Approximately 85% of the soybean acres in this Region use some form of supplemental irrigation. Without this supplemental irrigation, double-crop soybean production would not be feasibly in this Region due to the extremely hot and dry periods during the summer months.

There is considerable potential for the Mississippi River Delta Region to implement the soybean/wheat double crop system. However, this production system could be risky due to adverse environmental conditions during the growing season, and to volatile commodity markets. Producers considering the double crop system need to understand management challenges, and adopt best management practices to maximize profits for both crops within the double crop system.

Many of the double-crop production recommendations currently used by producer were developed over 15 years ago, and current research to develop up-to-date best management recommendations are needed. It is the goal of this project with collaboration among numerous universities across the U.S., local Qualified State Soybean Boards, and the United Soybean Board to develop current production
recommendation for double-crop soybean production and to educate producers about these recommendations.

Mississippi River Delta - Best Management Recommendations

1. Considerations for wheat production to maximize wheat and soybean yield.
   a. Select an early maturing wheat variety with high-yield potential to allow earlier soybean plantings.
   b. Decrease or eliminate cultivations of the wheat residue to maintain soil moisture and allow for earlier plantings of the soybean.
   c. Control glyphosate-resistant marestail in the wheat crop to prevent a problem with this weed during the soybean growing season.
   d. Consider harvesting wheat at a higher moisture and drying the wheat to allow for earlier soybean plantings (Note: potential research project submitted to Arkansas Soybean Promotion Board for funding considerations).

2. Variety selection to maximize yield during late plantings
   a. Regional work has indicated that MG IV soybean varieties have greater yield potential at later plantings compared to other maturity groups.
   b. In areas where glyphosate and PPO resistant Palmer amaranth are present, select varieties with glufosinate or varieties with stacked herbicide traits to control weed pressure.
   c. Select varieties with good defensive disease and nematode resistances.
   d. Germination and accelerated aging test should be performed on soybean seed lots to identify seed quality. Seeding rates may need to be adjusted higher based on these results.

3. Fertility for wheat and DC soybean
   a. Research from Arkansas indicate that fertilization with P and K can be applied prior to wheat planting for both crops, if the rate is calculated for both crops. Yield results are the same with a single application for both crops at wheat planting compared to fertilization applications prior to both the wheat and soybean crop.
   b. Proper soil samples should be pulled and analyzed for fertilization recommendations for both crops.

4. Wheat straw management prior to DC soybean planting.
   a. Use straw chopper to uniformity distribute wheat straw, and avoid wind-rowing wheat straw.
   b. Burning of the wheat straw is still a common practice in the Mid-south; however, this practice can cause delayed planting due to additional cultivations that are required, loss of soil moisture, and loss of nutrients during residue burning.
   c. Modification and adjustments to planters may be required to maintain good seed-to-soil contact and have proper closing of the seed furrow.

5. Planting considerations for DC soybean production.
   a. Consider increasing the seeding rate for DC soybean production 10—15% more that typically used for the full-season soybean production system.
b. Row-spacing’s less than 30 inches is recommended for DC soybean production. Narrow row spacing help the soybean crop canopy quicker, which reduces evaporation losses from the soil, reduces weed germination due to shading, increases leaf surface area, and increase irrigation efficiency.
c. The use of a combination insecticide/fungicide seed treatment is recommended for the DC soybean production system. These products provided protection from soil diseases and insects, and reduce the chances of having to replant the soybean crop.

6. Irrigation needs for DC soybean crop.
   a. Supplemental irrigation is strongly recommended for DC soybean production in the Mid-South. Late planted soybean yields are greatly increased with the use of irrigation compared to non-irrigated soybean.

7. Increased insect and disease pressure with DC soybean production.
   a. Typically, both foliar disease and insect pressure increases with later planted soybean. Scout fields weekly and apply fungicide and/or insecticides when economic thresholds for these pests are reached.

8. Weed control for DC soybean production.
   a. Residual herbicides with multiple modes of action are recommend no matter the herbicide technology of the soybean variety planted. It is recommended that overlapping residuals be applied with the first post-herbicide application.
   b. Control weed problem during the wheat crop to reduce these weed problems in the soybean crop.
   c. If sulfonyleurea herbicides are used during the wheat crop, STS soybean varieties must be selected.

Mississippi River Delta, Jeremy Ross’ Power Point Presentation
Overview of Double Crop Soybean Production System in Lower Mississippi River Delta Region
Jeremy Ross
Extension Agronomist
Lower Mississippi River Delta Region

- Arkansas, Louisiana, Mississippi, Missouri (Bootheel), and Tennessee
- Diverse row-crop production
  - Rice and Cotton
- 14 million planted acres
- Soybean yields have increased
  - Supplemental irrigation
Trends in Double Cropping

• Percent of planted acreage in double crop soybeans has declined since the 1980s
  – Highest recorded-16%
  – Below 10% since 1990
  – Average 6% for the last 5 years.
    • 5 year average across 9 states
      – Northern- IL, IN, KS, KY, and MO
      – Mid-South- AR, LA, MS, and TN

– Factors
  • Weather, commodity prices, input costs, etc.
<table>
<thead>
<tr>
<th>Year</th>
<th>Total Soybean Acres</th>
<th>% Double Crop</th>
<th>DC Soybean Acres</th>
<th>Total Soybean Acres</th>
<th>% Double Crop</th>
<th>DC Soybean Acres</th>
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</thead>
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<td>2008</td>
<td>3,300,000</td>
<td>0.27</td>
<td>891,000</td>
<td>1,050,000</td>
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<td>Total Soybean Acres</td>
<td>% Double Crop</td>
<td>DC Soybean Acres</td>
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<tr>
<td>2008</td>
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</table>
Wheat Plant Acreage/Price Trends in Arkansas (1996-2016)

Yearly Planted Wheat Acres for Arkansas (A)

Year


Yearly Wheat Price ($/Bu)

0.00 1.00 2.00 3.00 4.00 5.00 6.00 7.00 8.00

USDA-NASS website
Current Research Findings
(Most information has not been updated in 10 years)

- Stubble Management
- Maturity Group Selection
- Planting and Seeding Rate
- Row Spacing
- Soil Fertility
- Weed Control
- Insect Pest Management
- Disease Management
Stubble Management

• Wheat stubble creates a challenging seedbed
  – Must obtain adequate soil moisture
  – Good seed-to-soil contact
  – Management practices
    • No-till
    • Reduced tillage
      – Get in early, less labor, conserve soil moisture
    • Straw burning
      – Pollution, nutrient loss, soil quality degradation
Soybean Maturity Group Selection

- Choose the variety best suited for the area
  - Not too early
    - Short plants
    - Low yields
  - Not too late
    - Green plants
    - Pods at frost
Soybean Maturity

• Soybean varieties are divided into 11 MG – 000 to VIII

• Historically, MG IV – VI have been grown in the Mid-South
  – Recent move to earlier MG (III – IV)

• Planting a range of relative maturities reduces the risk of environmental factors
### Calculated Relative Yield for Soybean MG in Arkansas

<table>
<thead>
<tr>
<th>Location</th>
<th>MG</th>
<th>Max Rel. Yield</th>
<th>Yield Decline (%/day)</th>
<th>Estimated Relative Yield for Different PD</th>
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<tbody>
<tr>
<td></td>
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<td>Apr 1</td>
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<tr>
<td>Rohwer</td>
<td>3</td>
<td>98</td>
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<td>0.34</td>
<td>88 a</td>
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<td>5</td>
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<tr>
<td></td>
<td>6</td>
<td>0.11</td>
<td>63b</td>
<td>76 b</td>
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</table>

Same letters within a location and planting date column indicate similar yields at the 0.10 probability level.
Planting and Seeding Rate

• Planting
  – Some planters will need modification to plant in the dense stubble and plant residue
    • Must get good seed to soil contact
    • Get seed in furrow

• Seeding Rate
  – Increase seeding rate 10-15%
    • Stubble interference
    • Late planting date
Row Spacing

- Row spacing of less than 30 inches produce higher yields
- 20 inch row width - maximum yield
- 10 inch row width - water is a limiting factor
  - Less vegetative growth and branching
  - Need narrow rows for canopy closure
    - Increased soil water conservation
    - Less weed competition
Soil Fertility

• To prevent nutrient limitation of yield
  – Soil sampling
  – Soil testing
  – Fertilization according to recommendations

• Timing of Application
  – Many publications call for all nutrients to be applied while the wheat is in the field
  – Rate important, timing not as important
Fertilizer Application Time
Fall vs Spring Applications

• **Fall application OK if**
  - If soil test P and/or K level is MEDIUM or OPTIMUM

• **Spring apply if**
  - Soil test levels are VERY LOW or LOW
  - Nutrient deficiencies are commonly observed
  - Field is in flood zone
  - Field will be winter flooded for waterfowl
  - Using lower than recommended K rates

Wheat & double-crop soybean, 2007-2008
Soybean Response to Inoculation and Planting Date - May 2015

- **PTRS-SL**: 50 bushels/acre (UTC), 55 bushels/acre (Inoculated)
- **RRS-SL**: 90 bushels/acre (UTC), 95 bushels/acre (Inoculated)
- **VSS-SL**: 40 bushels/acre (UTC), 45 bushels/acre (Inoculated)
Current Research in Arkansas

Soybean Response to Inoculation and Planting Date - June 2015

Soybean Yield (bushels/acre)

- PTRS-SL: +0 bu/acre
- RRS-SL: +9 bu/acre
- VSS-SL: +10 bu/acre
Current Research in Arkansas

Soybean Response to Inoculation and Planting Date - July 2015

Soybean Yield (bushels/acre)

- PTRS-SL: +13 bu/acre
- RRS-SL: +12 bu/acre
- VSS-SL: +13 bu/acre

UTC and Inoculated
Conclusions

• All Inoculant Products Performed Equally Well

• Later Planting Dates Result In Significant Soybean Response to Inoculation

• Double-Crop Soybeans Tended to Have Highest Yield Response to Inoculation
Take Home Message

• Inoculation is “cheap” insurance
  – $1.5-3/acre

• In this trial there were no differences amongst inoculants
  – Cheapest
  – Easiest to treat
  – Planting window- some inoculants have <72 hr planting window after seed treatment

• Always use an Inoculant after May 15th
  – June response- 6 bushels/acre ~$48.00/acre
  – July response- 11 bushels/acre ~$88.00/acre
Weed Control

• Following Wheat
  – Use a burn-down herbicide
    • Glyphosate
    • Paraquat
  – Use a pre-emergence herbicide
    • Can be applied simultaneously
  – Use post-emergence herbicides
    • Control in-season weeds
    • Various choices to state recommendations
  – Good fit for Liberty Link soybean varieties
Insect Pest Management

• Because of timing of planting
  – Increased insect pressure should be planned for
  • Plan for 2-3 insecticide applications
    – Bean leaf beetle
    – Three-cornered alfalfa hopper
    – Stink bugs
    – Defoliating caterpillars
  • Apply based on established action thresholds
    – Rate and frequency should be adjusted to reduce impact on crop yield and seed quality
Disease Management

• Increased disease pressure on soybeans due to planting time
  – Budget for multiple fungicide applications
    • Soybean Rust
    • Pod and Stem Blight
    • Cercospora Leaf Blight
    • Aerial Blight
    • Anthracnose
  – Intense scouting of fields during reproduction
Is There an Opportunity to Increase Double Cropping?

- Research
- Opportunities and Advantages
- Constraints and Concerns
Where is the opportunity?

- Maps show the overlap of soybean and winter wheat acres
Opportunities and Advantages

- Increased ground cover prevents soil erosion
- Value of combined crops equal to full-season soybeans
- Improved cash flow throughout the year
- Added market opportunities
- Improved use of labor and equipment
- Can be accomplished with conservation tillage
- Wheat stubble <12 in provides mulch
- Potential to recapture nutrients from previous crop
Constrains and Concerns

- Decreased soybean yields
- Increased insect pressure
- Increased disease pressure
- Increased drought pressure
- Increased need for irrigation
- Increased input cost
- Variable commodity pricing
- Weather concerns
Review

• DC Soybeans have excellent yield potential
  – If wheat is harvested in a timely fashion

• Research and Recommendations
  – Are over 10 years old

• Economics
  – Profit of $496.56/acre to $321.31/acre

• Advantages
  – Increased sustainability and cash flow

• Disadvantages
  – Increased pest management and input cost
Questions?

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