Furrow Irrigated Rice (FIR) CCA 2018

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Agronomy / Rice
Rice Producing Counties in MO

Harvested Acres:

- 2010 – 251,000 Acres
- 2011 – 128,000 Acres
- 2012 – 177,000 Acres
- 2013 – 160,000 Acres
- 2014 – 216,000 Acres
- 2015 – 175,000 Acres
- 2016 – 200,000 Acres
- 2017 – 170,000 Acres
- 2018 – 230,000 Acres

County Rankings: 98%

1. Butler
2. Pemiscot
3. Stoddard
4. Dunklin
5. Scott
6. Wayne

Bollinger, Butler, Dunklin, New Madrid, Ripley, Cape Girardeau, Mississippi, Pemiscot, Stoddard, Scott, Wayne
ORYZA SATIVA –
RICE DD-50 CROP

First Rice grown in MO:
Cape County 1925 ?
Near Dudley early 1930s.
Arkansas 1902.
Hot Topics for MO Rice 18

- Furrow Irrigated or Row Rice (acres increasing)
- FIR is **Different** more testing-refinement needed.
- Rice Grain Quality* Med Grain, Aromatic
- Late season - Delayed harvest (desiccation)
- Constant Aquifer questions from non Ag sources ??
- Chemical Drift
  - Glyphosate, Ignite, Clearpath, Dicamba, Others
Parent materials of soils are different east and west of Crowley’s Ridge.

10,000 years ago Ohio and Mississippi Rivers converged farther south than Cairo, Illinois.
2018 MO Rice Irrigation Data

- *77 % Flooded Paddy
- *23 % Furrow Irrigated Rice (Bedded / Pivot)
- 99 % from wells - (1% from streams)
- 99 % drilled or broadcast tilled
- 1 % Water seeded

- SEMO AQUIFER is huge, deep, quickly recharged with the Ozark Karst and Miss River Aquifers.
Tillering-Clean-Start Flood
Rice Loves Water
Drought Stress Rice
<table>
<thead>
<tr>
<th>Seeding rate per acre – Lemont / clay soil</th>
<th>Rice yield per acre - MU Research</th>
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<tbody>
<tr>
<td>50 pounds (approximately 850,000 seed per acre)</td>
<td>107 bushels</td>
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<tr>
<td>100 pounds</td>
<td>130 bushels</td>
</tr>
<tr>
<td>150 pounds</td>
<td>121 bushels</td>
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<tr>
<td>200 pounds</td>
<td>119 bushels</td>
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Table 1
Seeding rates for furrow-irrigated rice.\(^1\)
\(^1\)Portageville, Mo. clay soil.
\(^2\)Rice variety = Lemont

1988

1988
Conclusions:  Paul Tracy, Barry Sims, Steven Hefner and John Cairns- MU Agronomy

Rice can be produced in southeast Missouri using furrow irrigation as the water delivery system. However, furrow irrigation is not intended to replace flood water management, but to serve as an alternative in environmental situations that prohibit flooded soil conditions. Principal situations where furrow irrigation may be appropriate include: expanding rice acreages into nontraditional rice soils for rotation; weed control (especially red rice); and disease control, or protection of federal base acreages, on soils incapable of maintaining a permanent flood and in areas where water is limited, or irrigation pumping costs are excessive.

As with any new management system, rice growers intending to furrow irrigate should do so on small acreages for 1 to 3 years until they are confident that it fits into their farming operation.

The authors would like to express special thanks to Gary Mayberry, a rice producer in Stoddard County, Missouri who developed the furrow-irrigated rice production concept and many of the production practices discussed in this publication.

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Advantages for Furrow Irrigated Rice

1. Rotate crops without tearing down levees, rebedding and reworking ground every year.
2. Prepare fields in the fall for any crop next spring.
3. Eliminate levees to gain more land area.
4. Flexibility to choose or switch a crop to plant right before planting. (economics, price)
5. Grow rice on irregular pitch fields.
7. Keep beds on wet heavy clay soils.
8. Easier to use ground equipment longer into season.
9. Easier to dry land and harvest with less ruts.
10.* Potential for less Arsenic and better milling grades?
11. Controls Rice Water Weevil.
Disadvantages of Furrow Irrigated Rice:

1. Potential for lower yield and milling grades, few trials showing a yield increase!!!
2. Weeds, Herbicide, applications and management cost increased? Top end vs lower end of field.
3. Water more difficult to apply uniformly? (dry spots)
4. Fertilizer, nutrient management more difficult and costly? Top end vs lower end of field.
5. Blast Greater probability.
7. No Crop Insurance? (pending)
8. Poly pipe cost and management?
9. Potential for more loss of water? (pumping cost)?
10. No disadvantages “IF” managed. Don’t compare to Flood.
All Furrow Irrigated Rice Fields were NOT created equal.

Rice Farmers should be prepared to fertilizer their furrow-irrigated or row rice acres on a field-by-field basis, LSU AgCenter Extension rice specialist says.

Not only fertilize on a field by field basis but all inputs will likely need choices like soil preparation, varieties, seeding rate, herbicides, irrigation, insect control, disease control and equipment.
Why is rice flooded?
FIR is Different

1. Water depth “MATTERS” Weeds, Blast, Bill Bug
2. Weed control - Flood over 2 + inches.
3. Blast – Flood over 4”
4. Bill Bugs – Water prevents egg lay at rice base
5. Rice doesn’t tolerate ongoing water stress
6. Rice soils must be super saturated (muddy) after tillering
7. FIR - controls Rice Water Weevil
Flooded Rice Soils

- Aerobic and Anaerobic Soil
  - The amount of oxygen in soil affects:
    - Soil Microbiology
    - Soil pH
    - Nutrient Availability
Why is Nutrient Management Important? FIR is Different

- Economics
  - Cost
  - Yield
  - Top vs Lower
Approach to Nutrient Management

FIR is Different

Row rice (Aerobic)

Flooding Paddy rice (Anaerobic)

Flooded condition (anaerobic) raises soil pH and increase availability of P and K
Phosphorus and Potassium Deficiencies

- **Brown spot** is the most common indication of N, P and K deficiency
  - (Top vs Lower End is Different)

- Nitrogen —--- 150 lbs / ac
- Phosphorus – 60 lbs / ac
- Potassium —--- 60 lbs /ac
- Sulfur —-------- 12 lbs / ac
Furrow Irrigated Rice Weed Control Recommendation

Start Clean and Stay Clean

1. Preplant Herbicides: Burndown Glyphosate + Dicamba or 2,4-D + Firstshot.

2. At Plant Herbicides: Gly + Command (gr, ssbl) Sharpen (lsbl)

3. Post Herbicides: Facet + Propanil, (Permit for Sedge)

4. Clearfield: Clearpath fb Newpath fb Beyond

5. Top vs Lower End (different)
Weed Control Issues

Grasses:
- Barnyardgrass
- Red Rice
- Broadleaf Signalgrass
- Sprangletop Sp.
- Fall Panicum

Broadleaves:
- Hemp Sesbania
- Morningglory Sp.
- Pigweed Sp.
- Eclipta
- Northern Jointvetch
15” Drill Flat-Tillering-Time to Kill Weeds
Palmer amaranth and other terrestrial weeds will be difficult to control in furrow-irrigated Clearfield rice due to continual emergence and resistant Palmer amaranth biotypes. Applying herbicides up to 4- to 6-lf stage of rice, including imazethapyr (Newpath) alone or in combination with other modes of action herbicide (Facet), was not sufficient to provide effective, season-long weed control. Additional herbicides like (2,4-D, Grandstand or Propanil) with alternative modes of action will be needed passed the 4- to 6-lf stage in furrow-irrigated rice, meaning that weed management may be more costly and quite challenging in this system.
FIR “60” Flat Bed - FISK
Bed Top Water Stressed
FIR - Top Water Stress
Bottom Not Stressed
-Fisk
FIR 30”- OTTER Slough Water Stress / Weeds
Bill Bug Larva - FIR 18
Lays Egg at Soil Line without Water
FIR 30” Top of Row Too Dry
Furrow Wetter & Taller
Four Common Rice Diseases MO

- Sheath blight
- **Blast *FIR**
- Kernel smut
- Brown spot
Blast Probability Greater FIR

1. Susceptible variety
2. Light soils
3. Lack of water = Loss of flood / levee rice / no outside levee / FI Rice / drought stress
4. Wet foliage (dew, rain, shade tree borders)
5. Somewhat cooler temperatures
6. Excessive High N rates
   ✓ Beware of fields with prior history
   ✓ Found often on levees / dry spots first / FIR
Blast Management FIR

1. Plant **resistant** varieties **Hybrids** in fields that are:
   - difficult to keep flooded
   - have a history of blast

2. Plant in **April**

3. Apply recommended **N**

4. Maintain **consistent deep flood**

5. **Scout** for leaf lesions early

6. **Treat** promptly at threshold (2 times?)
   * especially if weather is favorable to disease
Symptoms of blast
Symptoms of blast
Symptoms of blast
Symptoms of blast
The Cycle & Symptoms of Rice Blast Disease

- Spores
- Rotten Neck
- Leaf Spot
Blast Fungicide-FIR
UAR MP-154 Plant Disease Control Guide

- Quadris (12.5) fl oz / ac
- GEM (4.7) fl oz / ac
- Stratego (19) fl oz / ac
- Quilt Excel (27) fl oz / ac

✓ Apply at boot split to heading
✓ Apply again in 5-7 days (50-75% head emergence)
Symptoms of sheath blight
Symptoms of sheath blight
Symptoms of kernel smut
Symptoms of kernel smut
N - Furrow Irrigated Rice - UAR

• Nitrogen application on FIR may be a little different with a higher rate at top 1/3, with progressively less at the bottom. (Tissue sample)

• Instead of the normal 2 N applications, raised beds use 4 at the same total.

• Use the same total N in smaller amounts spread out over time. This differs from RiceTec recommendations

• Recommend 120 lbs preflood and 30 lbs at late boot.

• Urea should be treated with Agrotain* before application on FIR between the 3-5 leaf stage.

• Ammonium Sulfate or DAP can be used for a flush application instead of Urea.
Rice Tech - FIR Statements

• The benefits of raising rice on beds requires less labor, less fuel, and a dramatic reduction in conventional cultural practices;
• therefore increasing the potential of putting ground into production that normally required large numbers of levees to water.
• The labor cost is drastically reduced, with no need in checking or maintaining levees everyday.
• The fuel cost can be cut down as well, without having to maintain a consistent flood, or trying to maintain a consistent flood.
• Herbicide application also becomes a little easier with the absence of levees. With no levees present you have the choice of putting your herbicides out by ground or air.
• A good application of a residual herbicide is key, when trying to prevent heavy infestations of weeds before the rice has had a chance to tiller.
• Insects such as the water weevils, said to be the worst in rice, no longer present a problem, except Bill Bugs.
2017 Rice Varieties FIR

- New: CL 153 blast resistance, improved grain quality vs Old: CL 151.
- New: CL 172 is a new simi-dwarf with blast resistance, better quality and yields between Old: CL 111 and CL 151.
- New: CL XP766 (marketed as RT7311 CL in 2017) is a Clearfield hybrid that is a CL version of Old: XL 753
- New: Gemini CL 214 is a long grain Clearfield provides improved grain retention and Bacterial Panicle Blight resistance.
- New: Diamond has excellent yield potential but is susceptible to blast and bacterial panicle blight.
- New: Titan is a new medium grain also susceptible to blast and bacterial panicle blight.
- New: Provisa had serious stunt and Blast problems on 5 fields I checked.

- Old: LaKast, Roy J and Taggart have performed well and will be available in 2019
Table 1. Preliminary recommended rice cultivars for Arkansas in 2019.

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<td>Diamond</td>
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<td>Titan</td>
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<tr>
<td>LaKast</td>
<td>RT XP760</td>
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<td>RT 7311 CL</td>
<td>Jupiter</td>
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<tr>
<td>Roy J</td>
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<td>RT CLXL745</td>
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Alternate Wetting & Drying Rice Flood Management (AWD)

- AWD is not to be confused with Furrow Irrigated Rice.
- The timing, frequency, and extent of the wetting and drying cycles depend on rice growth stage, prevailing weather and field conditions, and grower comfort level with the practice.
- Three weeks after initial flood.
- AWD flood. Begin AWD flood by halting irrigation and allow flood to subside naturally. Reestablish flood when mud appears in top third of paddy, **do not allow soil to form cracks.** Repeat cycle. Apply postemergence weed control as needed, per university recommendations.
- If new to AWD, begin with single dry down as recommended for straighthead control. The ultimate number of wet-dry cycles is a function of weather, field, soil conditions, and producer comfort with AWD.

**Buyer Beware (Sam Atwell)**
Questions