No-till Field Day

Types of No-Till Planting, Agronomy and Challenges

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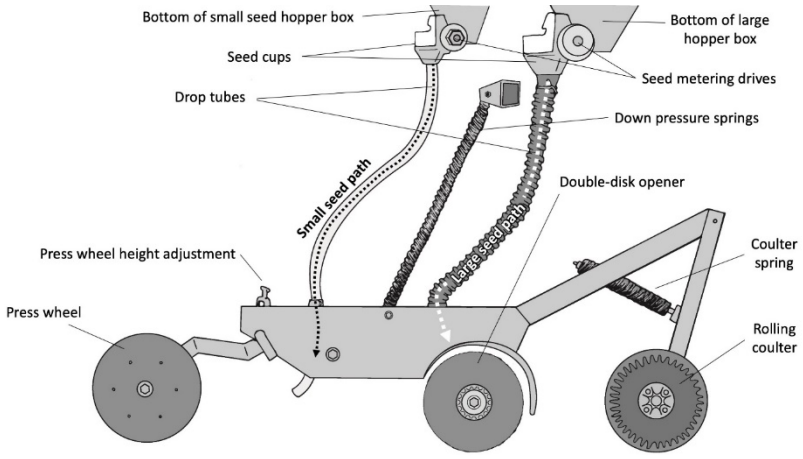
Why are we doing this research?

- Water savings
- Tillage costs
- Early planting
- Weed management

What is it?

All of what we are looking at requires a no-till drill. Main difference is weight, rolling coulter (initial cut into soil and through residue), and cost.



Different seedbeds: following fallow or following rice

Summer Prep: Field made into a seedbed the summer before-during the fallow period

Fall Prep: Rice grown the previous season; soil worked after harvest to make seedbed

No-till: Rice planted into a harvested rice field with no tillage following harvest. Seedbeds can differ depending on how straw was managed.

Current and future research:

- Economics
- Establishment
- Optimizing fertility for different systems (sources, splits, enhanced efficiency fertilizers)
- Quantifying water savings
- Quantifying GHG emissions
- Weed and pest management
- Testing on different soils through on-farm research

2023/2024 yields

RES we are looking at Summer Prep and Strict No-till.

- Summer Prep good yields and generally comparable to water seeded yields.
- Strict NT is 5-10% lower
- Maximum yields achieved with 175 lb N/ac in all systems.

Growers have generally seen comparable yields to water seeding.

2025 RES dates:

April 21: Plant (150 lb/ac), apply Prowl
April 22/23: Flush
April 27: Drain
May 4-9: 50% emergence (about 7-10 days)
May 21: applied urea, herbicide application (Clincher and Loyant)
May 21/22: Permanent flood

How much seed?

Data from the mid-south suggests that the minimum number of established plants/ft^2 is 12. One needs to consider seed size (varies by variety) and percent germination. For most CA medium grain varieties, planting at 150, 100 and 50 lb/ac gives about 54, 36, and 18 seeds/ft^2, respectively.

Seed spacing for drill calibration (or plant density)				
	Row spacing (inches)			
Seeds (plants)/ft^2	6	7	8	10
	Seeds (plants) per row foot			
10	5	6	7	8
15	8	9	10	13
20	10	12	13	17
25	13	15	17	21
30	15	17	20	25
35	18	21	23	29
40	20	23	27	33
45	23	26	30	38
50	25	29	33	42

Germination and emergence:

- Germination will start once water is off the field following a flush.
- Low spots delay emergence.
- At RES: 150 lb seed/ac, 7” row spacing, we have 15-18 emerged plants/ft in removed and fallow (12 in chopped). We have 20-30 plants/ft2. About ½ of our seeds emerged.

Water savings:
RES: water savings (ET) of about 5" compared to water-seeding. Why?

- Less ET from planting to permanent flood. Soil is dry on surface for much of the time and plants are small.
    - Multiple flushes will result in ET being similar to water-seeding
- Soil has more moisture in it at planting.

Take home lessons (agronomy):

- Field size and soil type are important considerations
- Planting goal: uniform stand establishment: plant density & stand age (weed management)
- Winter weeds are a challenge
- Seedbed: level for uniform seed placement
- Seedbed: ditches to move water on and off field quickly
- When to plant?
    - Soil needs to be dry enough to support equipment and not stick to coulter
    - Straw on top needs to be dry so the coulter cuts through it, instead of folding it
    - Can time planting for a rainfall event to help avoid flushing
    - Germination/emergence will depend on moisture and temperature (60 F). This is typically around mid-April.
- Planting takes a while. Equipment is narrow and tractor speeds slow. 40-50 ac/day?
- Planting depth: ¾ to 1 inch. Going deeper will delay emergence and may require additional flushes.
- Flushing or not? An initial flush provides more uniformity of emergence (good rainfall may do the same). At RES we went 25-30 days from initial flush to permanent flood with no flushes in between. Soil is dry to about 2 inches but water/roots below.
- When to go into a permanent flood: 3-4 leaf stage and soil is dry on surface.
- At 3-4 leaf stage the rice is shorter/smaller than in water seeded systems.
- Fertilizer application: apply just before permanent flood to a soil that is dry on surface. Using urea and a dry surface helps ensure fertilizer is pushed down into soil.
- Harvest: Compared to water seeding, these systems will be delayed by 5-10 days.