

# Rice Establishment Study and N Management - Rice Experiment Station, 2004 - 2007

Please contact Kaden Koffler at [kbkoffler@ucdavis.edu](mailto:kbkoffler@ucdavis.edu) or 530-752-3457 with questions or for more information.

## Background

2007 is the fourth year N rate trials have been conducted. Each main plot treatment has 5 N rates. The rates for 2006 and 2007 were 0, 100, 100 (with a split application), and 200 lb N / acre, respectively. Please note that the total N applied for some of the N treatments was different between 2004/2005 and 2006/2007. All N rates across years are listed in Table 1 on page 4. In all years, the “A” has been a rate of 150 lb N / acre and has matched the N management in the main plot treatment. In 2004 and 2005, N treatments B, C, D, and E ranged from 0 to 200 lb N / acre (Table 1). In 2006 and 2007, N treatments B, C, D, and E were kept consistent across all the main plot treatments so that N-response curves could be directly compared.

## 2007 Nitrogen Treatments

Water Seeded (WS): 0, 50, 100, 150, & 200 lb/acre

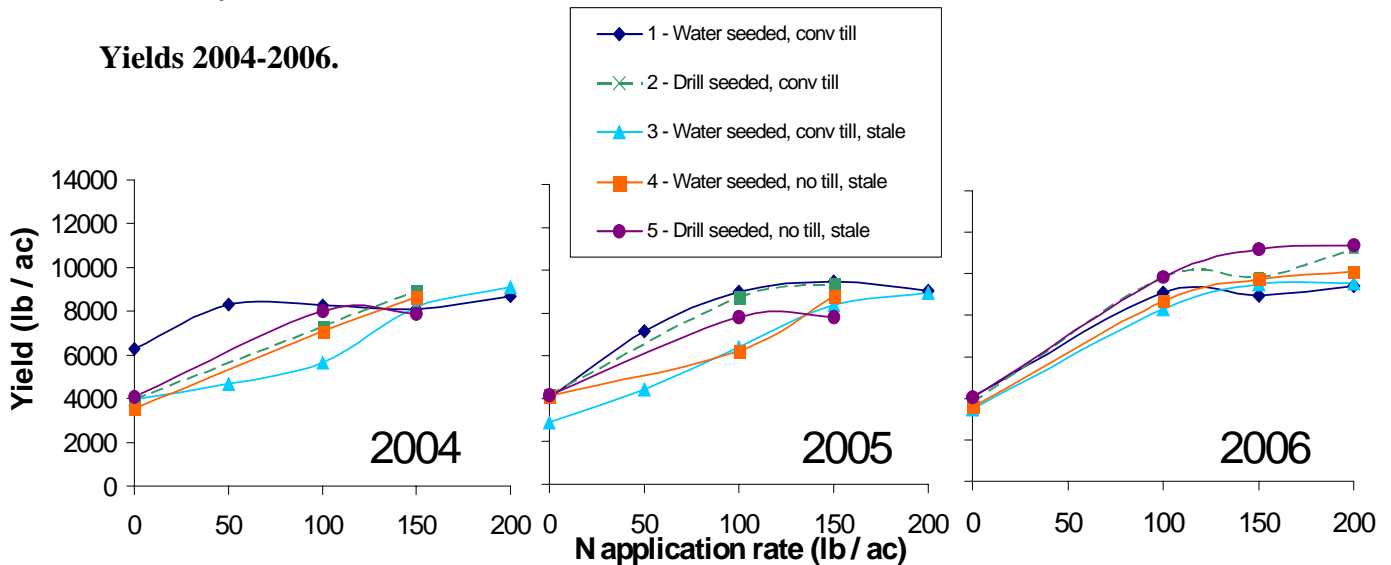
Drill Seeded (DS): 0, 100, 150 lb/acre

WS Conventional: Preflood & Preflood/PI split (50 lb/50 lb)  
 WS Stale: Preflood & Preflood/PI split (50 / 50)  
 WS No-till Stale: Preflood & Preflood/PI split (50 / 50)

DS Conventional: Preplant & Preplant/Permanent Flood split (50 / 50)  
 DS No-till Stale: Permanent Flood  
 Preplant/Permanent Flood split (150/50 & 50/50)  
 Permanent Flood/PI split (100/50)

## Summary of Results

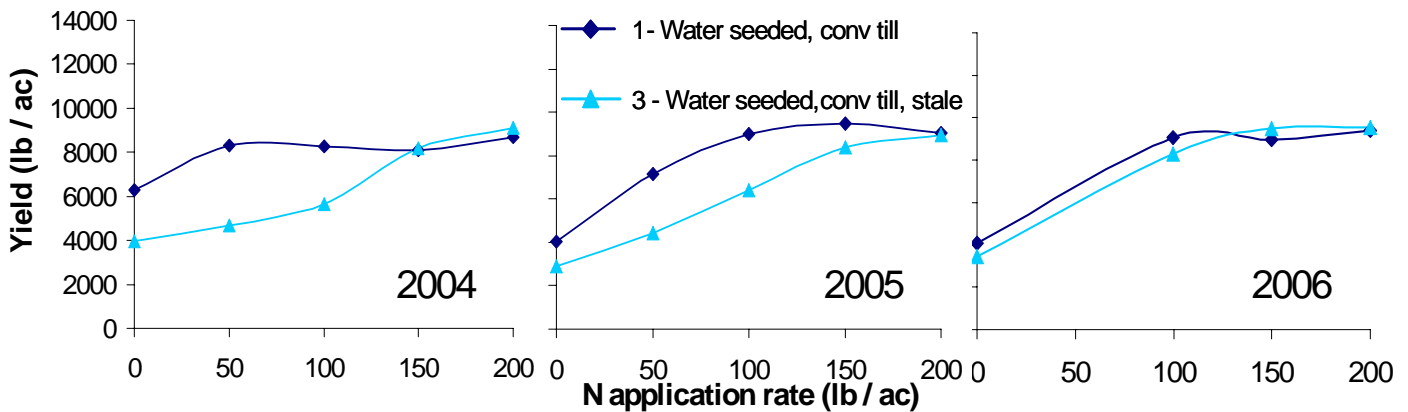
### Yields 2004-2006.



## Summary

- All systems appear to have similar yield potential, but some require higher N rates.
- Yield differences among systems can't be entirely explained by N losses from flushing events.
- Tillage and seeding method are probably interacting with early season water management to influence yield trends as well.
- Some of these alternative systems may become more attractive to growers struggling with conventional weed management, particularly as N management for these systems becomes more optimized.

## Stale-seedbed Practice and N Management



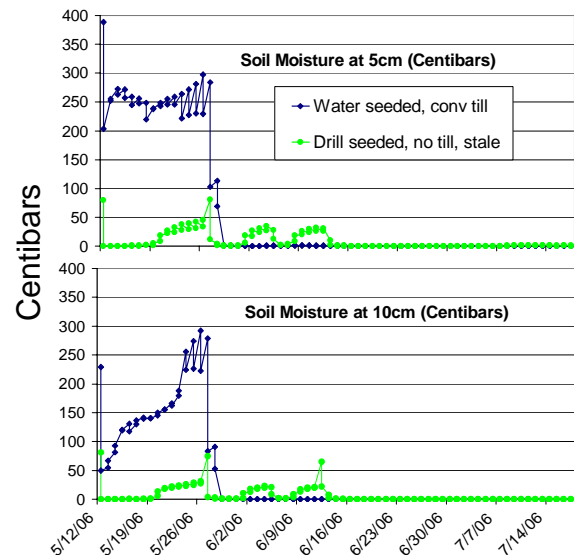
**Figure 2.** Yield response of systems 1 and 3 to different N rates ranging from 0-200 lb N/ac. Yields are in lb/ac and are adjusted to 14% moisture.

- A direct comparison between systems 1 and 3 suggests the stale seedbed practice in the early season leads to N loss, which can be compensated for, however, by applying N at higher rates. In all 3 years, system 1 achieved maximum yields with about 50 lb N/ac less than in treatment 3.

## Nitrification Potential during Drying Phase of Flush

In 2006 soil moisture was continuously monitored with data loggers. Results showed that at both 5cm and 10cm depths soil became aerobic during the soil draining and drying phase of stale seedbed practices, or flash-flooding practices to germinate the drill-seeded rice. This is an indication that conditions to support nitrification potential are good.

Aerobic at 5 and 10 cm depths during soil drying period



**Figure 3.** Soil moisture in 2006, measured in centibars, at both 5cm (top) and 10cm (bottom) depths in the water seeded, conventional tillage system (treatment 1) and the drill-seeded, no till, stale seedbed system (treatment 5). The spikes in early to mid June in treatment 5 represent soil drying periods.

**Take home message:**

- All systems appear to have similar yield potential, but some require higher N rates.
- Yield differences among systems can't be entirely explained by N losses from flushing events.
- Tillage and seeding method are probably interacting with early season water management to influence yield trends as well.
- Some of these alternative systems may become more attractive to growers struggling with conventional weed management, particularly as N management for these systems becomes better understood.

**Table 1.** Overview of timing and rate of N application for the subplot N treatments in 2004-2007.

System	N sub treatment	Total N applied	2004						2005						Total N applied	2006 - 2007						
			PS-S	PD-I	PD-S	PF-I	PF-S	TD	PS-S	PD-I	PD-S	PF-I	PF-S	TD		PS-S	PD-I	PD-S	PF-I	PF-S	TD	
1 Water seeded - conventional	A	150	0	0	0	150	0	0	0	0	0	0	150	0	0	150	0	0	0	150	0	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	50	0	0	0	50	0	0	0	0	0	0	50	0	0	100	0	0	0	100	0	0
	D	100	0	0	0	100	0	0	0	0	0	0	100	0	0	100	0	0	0	50	0	50
	E	200	0	0	0	200	0	0	0	0	0	0	200	0	0	200	0	0	0	200	0	0
2 Drill seeded - conventional	A	150	0	50	0	0	100	0	0	50	0	0	100	0	150	0	50	0	0	100	0	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	100	0	0	0	0	50	50	0	0	0	0	50	50	100	0	0	0	0	100	0	0
	D	150	0	50	0	0	50	50	0	0	0	0	150	0	100	0	50	0	0	50	0	0
	E	150	0	0	0	0	100	50	0	0	0	0	100	50	200	0	0	0	0	200	0	0
3 Water seeded - stale	A	150	0	0	0	0	150	0	0	0	0	0	150	0	150	0	0	0	0	150	0	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	50	0	0	0	0	50	0	0	0	0	0	50	0	100	0	0	0	0	100	0	0
	D	100	0	0	0	0	100	0	0	0	0	0	100	0	100	0	0	0	0	50	50	0
	E	200	0	0	0	0	200	0	0	0	0	0	200	0	200	0	0	0	0	200	0	0
4 Water seeded - no till stale	A	150	0	0	0	0	100	50	0	0	0	0	100	50	150	0	0	0	0	100	50	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	100	0	0	0	0	50	50	0	0	0	0	50	50	100	0	0	0	0	100	0	0
	D	150	50	0	0	0	50	50	0	0	0	0	150	0	100	0	0	0	0	50	50	0
	E	150	50	0	0	0	100	0	50	0	0	0	100	0	200	0	0	0	0	200	0	0
5 Drill seeded - no till stale	A	150	0	0	0	0	100	50	0	0	0	0	100	50	150	0	0	0	0	100	50	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	100	0	0	0	0	50	50	0	0	0	0	50	50	100	0	0	0	0	100	0	0
	D	150	0	0	50	0	50	50	0	0	0	0	150	0	100	0	0	50	0	50	0	0
	E	150	0	0	50	0	100	0	0	0	50	0	100	0	200	0	0	50	0	150	0	0

PS-S: Pre-stale Surface  
 PD-I: Pre-drill Incorporated  
 PD-S: Pre-drill Surface  
 PF-I: Pre-flood Incorporated  
 PF-S: Pre-flood Surface  
 TD: Top-dress in between MT and PI