Wide Space Irrigation: What Do We know?





Issues watering in Clay

- Over Saturation
- Furrow vs. Sprinkler
- Rain after irrigation in furrow
- What can we do differently?
- How far can we separate it?
 - Does it hurt yield?
 - Where does the water go?









Saturation: How much does this cost you every year? Is it a cumulative effect?







Rationale How do we irrigate more efficiently?

- Grower posed us with these questions
 - How do we reduce waterlogging after an irrigation and a rainfall?
 - Can we space out our irrigated furrows to reduce waterlogging events and maintain or improve yield?
 - How far?
- If corn can be irrigated successfully in shrink swell clay soils, it can lead to better crop rotations.













- Evaluate different furrow irrigation spacings on shrink swell clay soils to reduce waterlogging while maintaining yield.
- Hypothesis: Farther spaced irrigated furrows will reduce waterlogging and maintain corn yield



Methodology

- Treatments:
 - -2021 -2022 -2023
 - 10ft 10ft 10ft
 - 15ft 15ft 15ft
 - 20ft 20ft 20ft
 - 25ft TT TT





On-Farm Lay out

On-Farm Treatments						
10ft	20ft	тт				
34 gpm every other furrow	68 gpm every fourth furrow	68 gpm every trafficked furrow				
Polypipe	Polypipe	Polypipe				
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16				

Treatment designs for the 2021 - 2023 growing seasons; the blue dashed lines represent furrows irrigated.

















On-Farm Yield

Treatment	Yield (bu/ac)	
10ft	209	
20ft	207	
Tractor Track	214	





Methodology

Site 1 (On-Station)

- Year: 2021-2023
- Site: NCAAR (33°25′40.4″ N, 90°57′22.9″ W)
- Soil Type: Sharkey Clay
- Experimental Design: RCBD; 4 treatments; 4 replications
- Plot Dimensions: 1 m row spacing; 15.24 m long X 16 m wide (one replication is 32 m Wide)



Methodology

- Treatments:
 - 1. 3.3ft (Every Row)
 - 2. 6.6ft (Skip Row)
 - 3. 13.3ft (4 Row Skip)
 - 4. 26.6ft (8 Row Skip)



Figure 1: Numbers 1-16 indicate corn rows, the blue dashed lines represent furrows irrigated, "A" represent harvest areas adjacent to irrigated furrows, and "S" represents harvest areas in the middle of the skip.

	On-Station	Treatments	
3.3ft	6.7ft	13.3ft	26.7ft
1 hole every furrow	2 holes every other furrow	4 holes every fourth furrow	8 holes every eighth furrow
Polypipe	Polypipe	Polypipe	Polypipe
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 50ft
Тор			Top 50ft
			300f
Bottom			Bottom 50ft
			A A S S A A 50ft



3.3ft (Every Row)





6.7 ft (Skip Row)





13.Ft (4 Row Skip)





26.7ft (8 Row Skip)





















Water Advancement





26.7ft (8 row Skip) 8in 16in 24in 30in







On-station Yield





On-Station Yield (2021-2023)

Location	Treatment	Yield	LS-Means	
Тор	8R (26.7ft)	147	Α	
Тор	4R (13.3ft)	131.14	AB	
Тор	ER (3.3ft)	131.01	AB	
Тор	SR (6.7ft)	126.03	В	
Location	Treatment	Yield	LS-Means	
Location Bottom	Treatment SR	Yield 151.36	LS-Means A	
Location Bottom Bottom	Treatment SR ER	Yield 151.36 147.14	LS-Means A A	
Location Bottom Bottom Bottom	Treatment SR ER 8R	Yield 151.36 147.14 146.86 146.86	LS-Means A A A	

* LS-Means with the same letter are not statistically different.

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Treatment	Area	Protein %	100 seed wt. (lbs)
13.3ft	Skipped	<u>9.73 a</u>	<u>0.075 a</u>
26.7ft	Skipped	9.50 ab	<u>0.074 a</u>
3.3ft	Adjacent	9.48 b	0.072 b
26.7ft	Adjacent	9.38 bc	0.072b
6.7ft	Adjacent	9.28 cd	0.072b
13.3ft	Adjacent	9.15 d	0.072b



Conclusions

- The data from both the on-station and on-farm trials showed that yield can be maintained with different furrow irrigation spacings.
- Water advances faster down the furrow
- Water moves laterally across 26-30ft



Questions?

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