



Evaluation of a novel drought-tolerant inoculant on soybean yield and nodulation in the Mid-South

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2019 FIELD WORK

Texas, Arkansas, Missouri,
Mississippi, Louisiana, and
Tennessee



Collaborators

- Dr. James Grichar – Texas A&M AgriLife Research.
- Drs. Avat Shekoofa and Vince Pantalone – University of Tennessee.
- Dr. Pengyin Chen – University of Missouri.
- Dr. J. Rusty Smith – USDA-ARS, Mississippi.
- Dr. Trey Price – Louisiana State University.
- Dr. Leandro Mozzoni – University of Arkansas.

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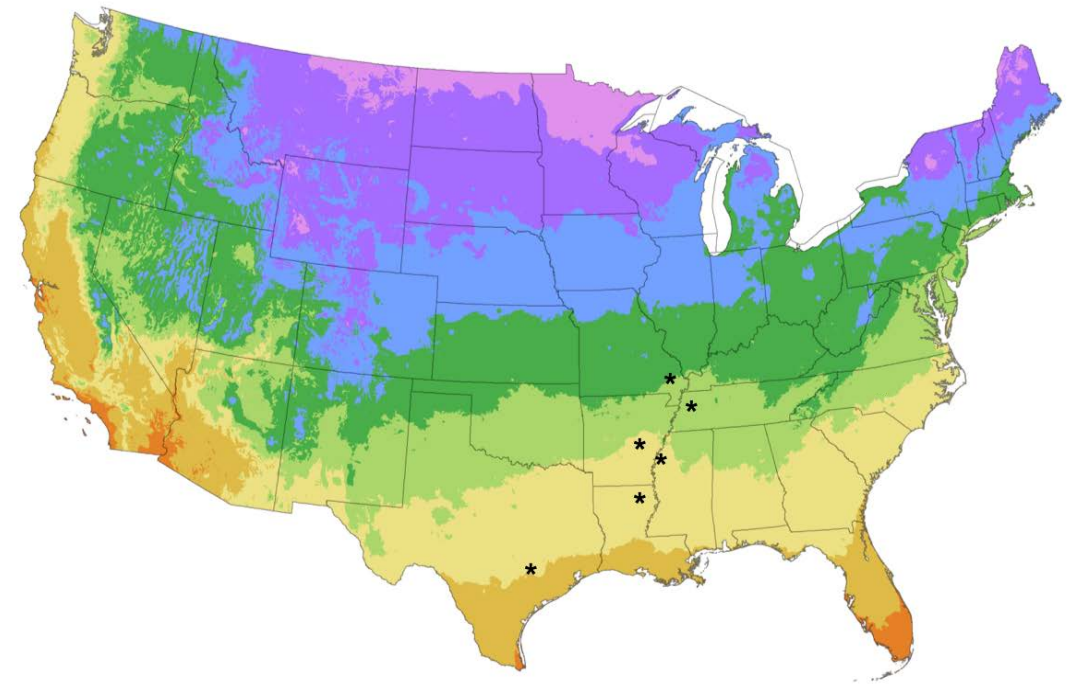
Goal of Project

Test the Texas-native drought-tolerant inoculant (TX-VA) under irrigated and non-irrigated conditions across drought prone regions in the mid-south.

Three treatments:

- TX-VA
- Cell-Tech (commercial inoculant)
- No inoculant

USDA Plant Hardiness Zone Map

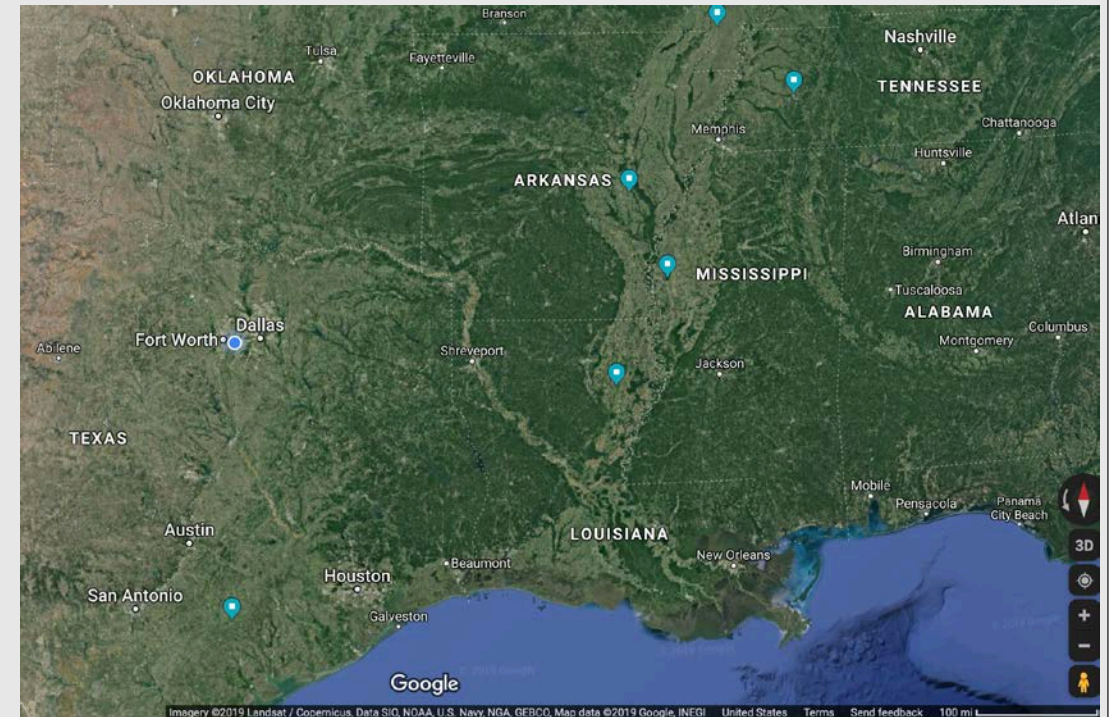


<https://planthardiness.ars.usda.gov/PHZMWeb/>



Multi-region evaluation of the drought-tolerant *Bradyrhizobium* inoculant (TX-VA strain)

State	GPS	Planting date	Sampling date	Harvest date	Soil type	Cultivar	Maturity Group
Yoakum, Texas	29°16'N 97°07'W	2-Apr	22-Jun		Tremona loamy fine sand	S52RS86	5
Jackson, Tennessee	35°37'N 88°50'W	6-May	25-Jun		Iuka fine sandy loam	TN16520	4
Clarkton, Missouri	36°29'N 89°57'W	7-May	10-Jul		Malden fine sand	TN16520	4
Winnsboro, Louisiana	32°08'N 91°41'W	16-May	12-Jul		Jigger-Gilbert silt loam	TN16520	4
Stoneville, Mississippi	33°25'N 90°53'W	17-May	11-Jul		Commerce silty clay loam	TN16520	4
Stuttgart, Arkansas	34°28'N 91°25'W	2-Jul			Dewitt silt loam	TN16520	4





Yoakum, Texas

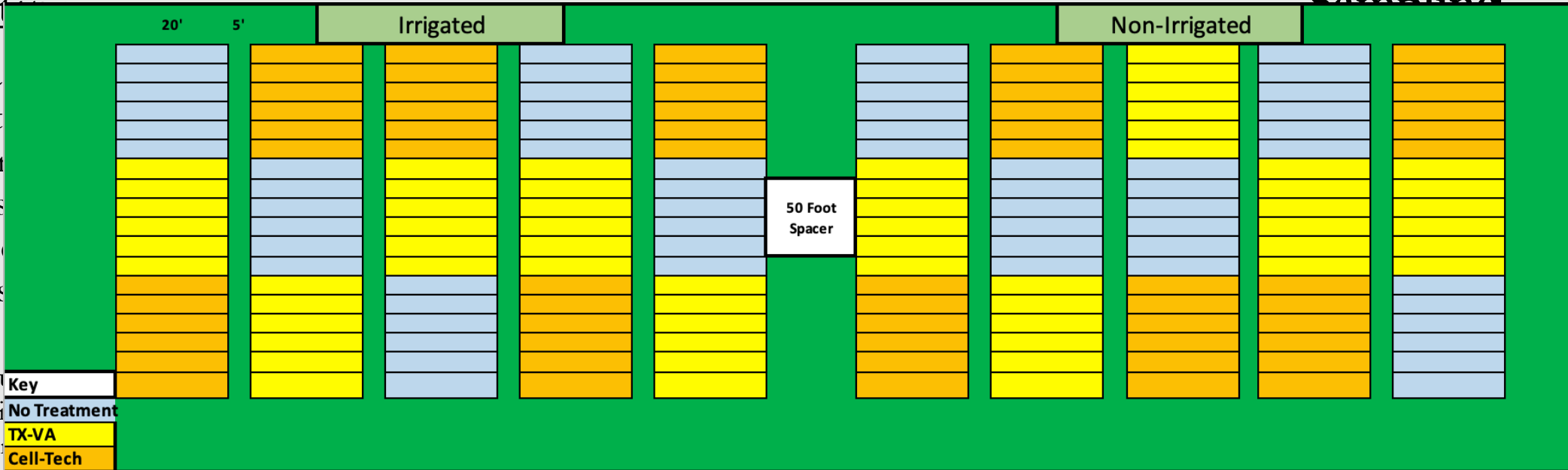
Planting

- 3 Treatments
- Irrigated
- 20 ft. x 5 ft. plots
- 6 rows per plot
- 10 seeds per row
- 50 ft. spacing between plots
- **Planting**

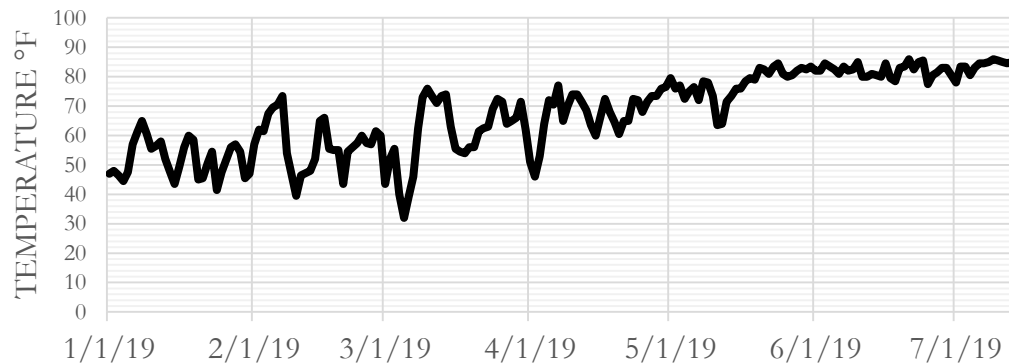
Sampling

Number,
Module

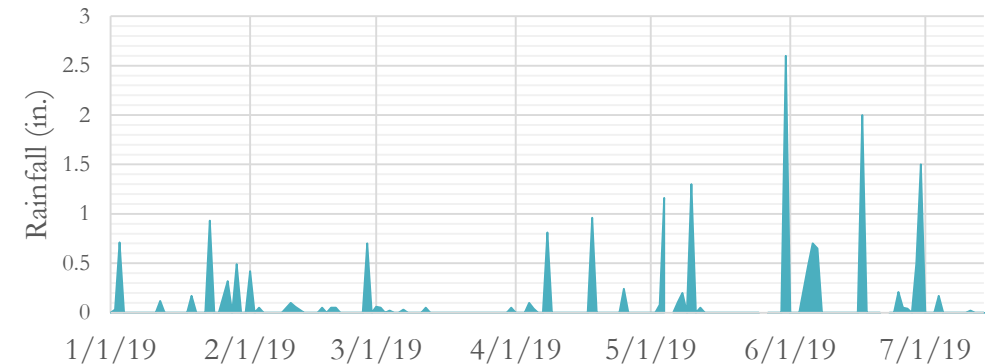
Fig. 1
AgriLife
Dropper
Disassembled seed plates for sterilization



Yoakum TX Avg. Daily Temperature



Yoakum TX Daily Precipitation



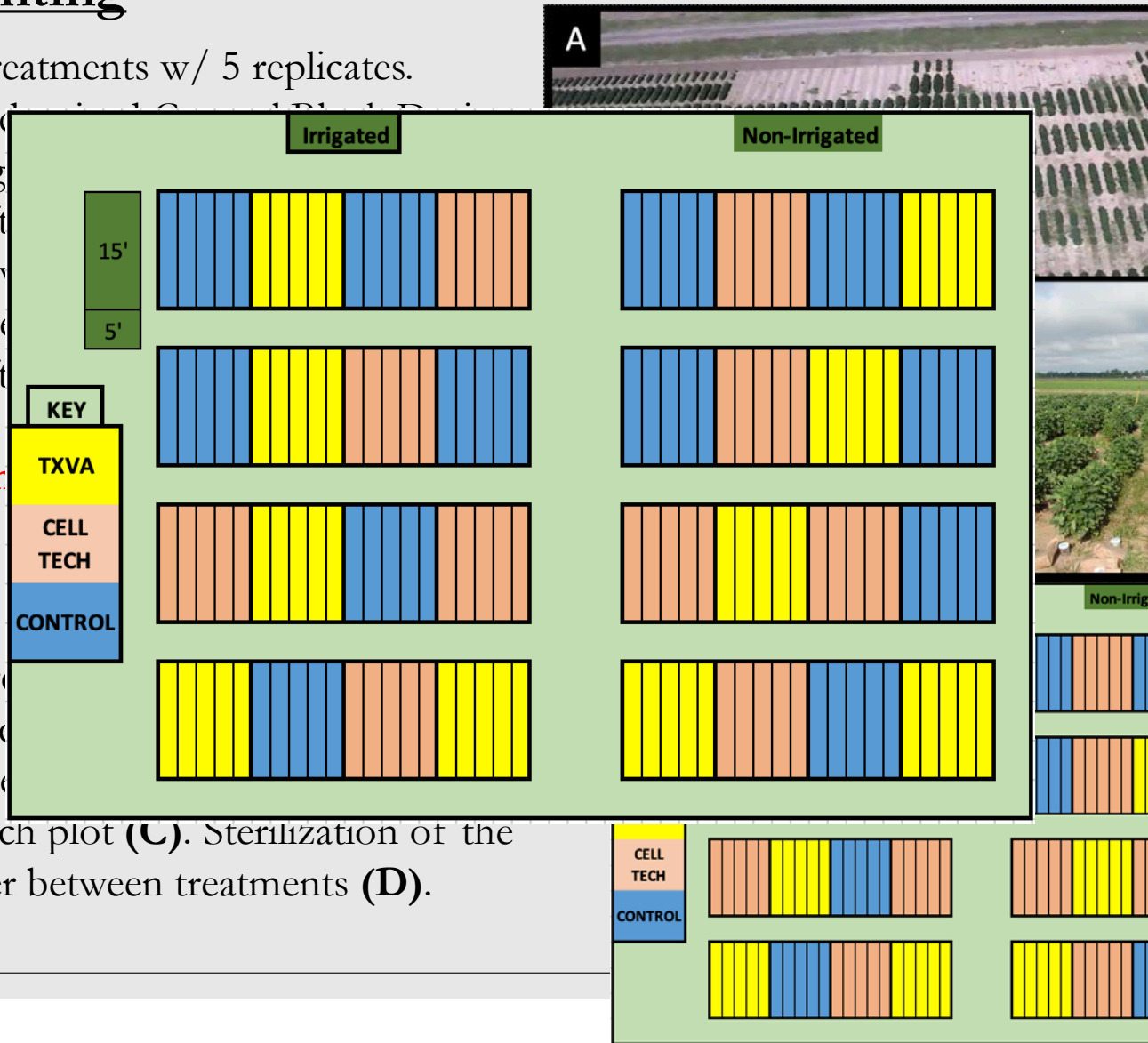


Stoneville, Mississippi.

Planting

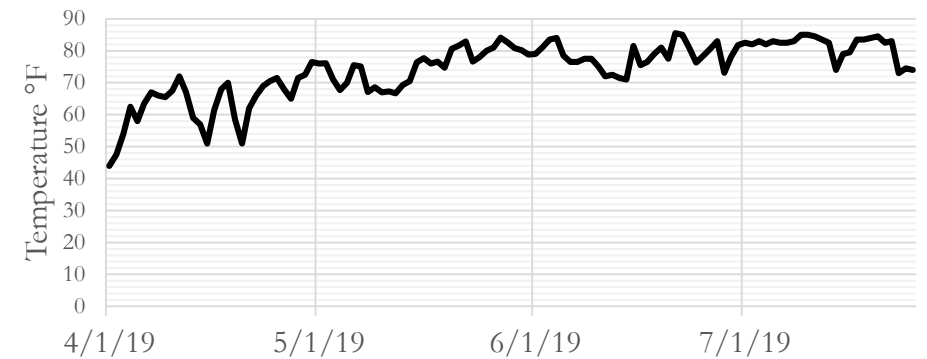
- 3 Treatments w/ 5 replicates.
- Randomized Complete Block Design
- Irrigated
- 15 ft
- 4 rows
- 10 seeds
- 15 ft
- Plant

Figure 1. Research plot (C). Sterilization of the planter between treatments (D).



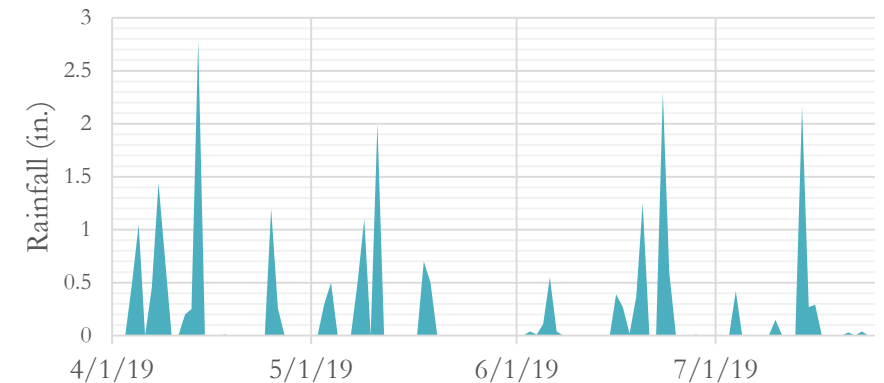
Sampling

Stoneville MS Avg. Daily Temperature



• N = 180

Stoneville MS Daily Precipitation

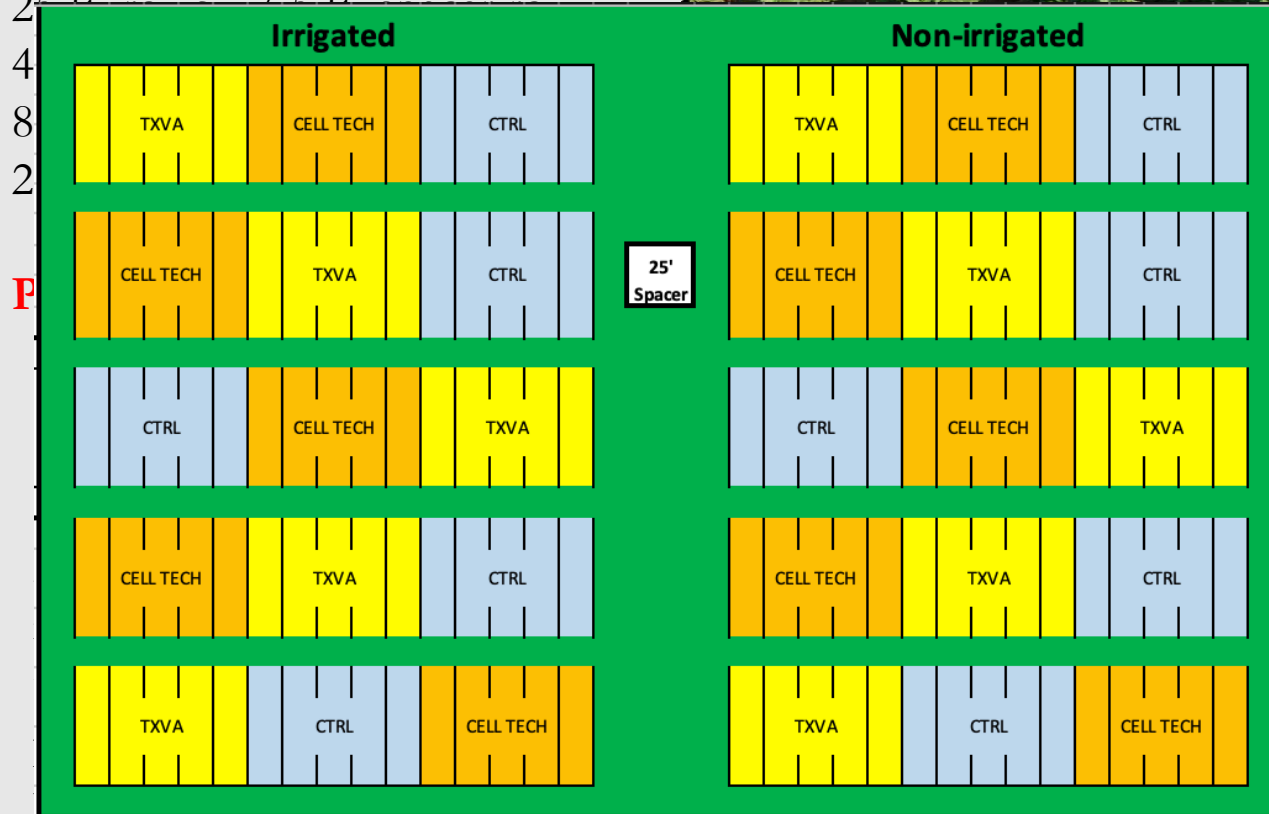




Winnsboro, Louisiana.

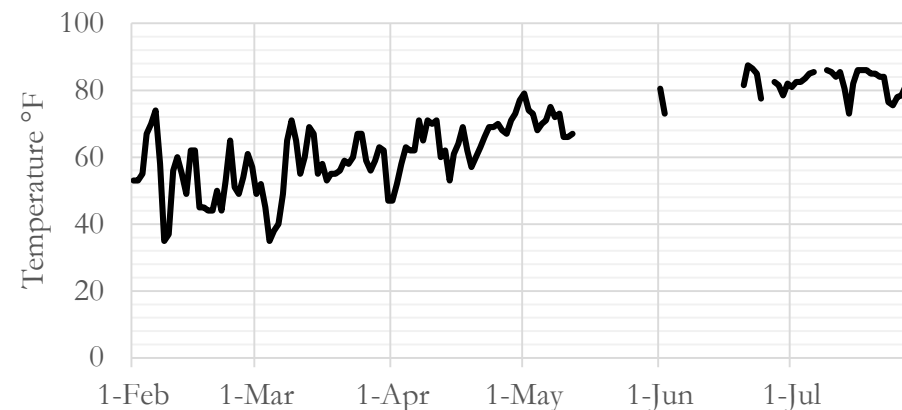
Planting

- 3 Treatments w/ 5 replicates.
- Irrigated/Non-irrigated conditions.

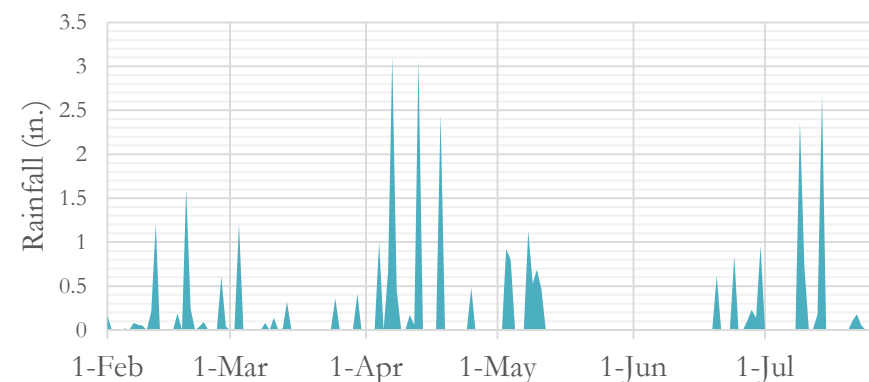


Sampling

Winnsboro LA Avg. Daily Temperature



Winnsboro LA Daily Precipitation





Clarkton, Missouri.

Planting

- 3 Treatments w/ 5 replicates
- Irrigated/Non-Irrigated
- 12 ft. rows
- 4 rows per replicate
- spacing.
- 12 seeds per foot
- 50 ft. spacing

Plant Stand

KEY	
Control	Blue
TXVA	Yellow
CELL TECH	Orange

KEY	
Control	Blue
TXVA	Yellow
CELL TECH	Orange

KEY										
Control	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
TXVA	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
CELL TECH	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange

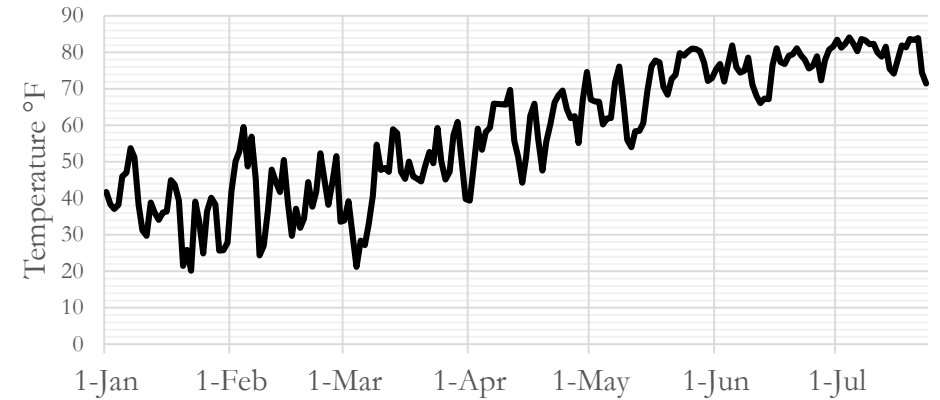
KEY										
Control	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
TXVA	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
CELL TECH	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange



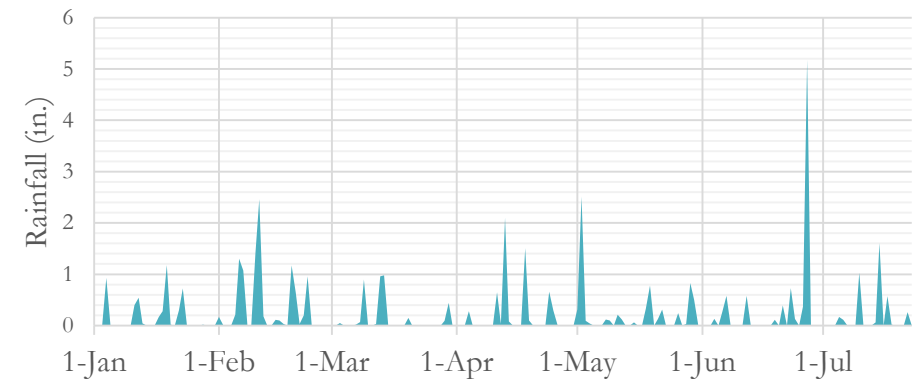
image of the field
of (L) plant TXVA
delivered from

Sampling

Clarkton MO Avg. Daily Temperature



Clarkton MO Daily Precipitation





Jackson, Tennessee.

Planting

- 3 Treatments w/ 4 replicates.

- N

- 20

- 4

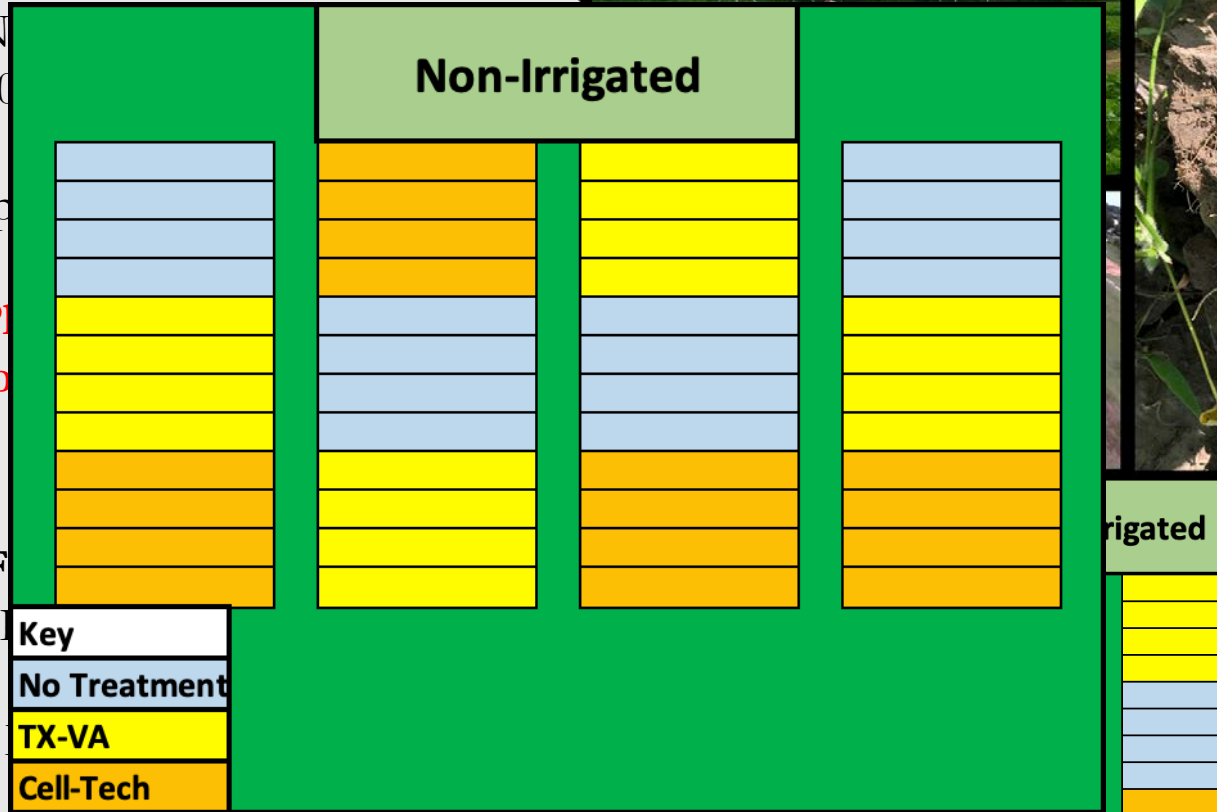
- sp

- 9

- P

to

F

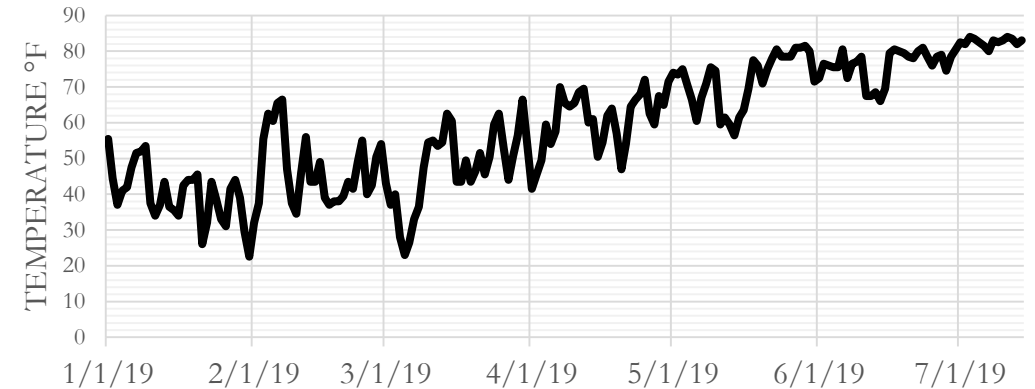


planter (D).

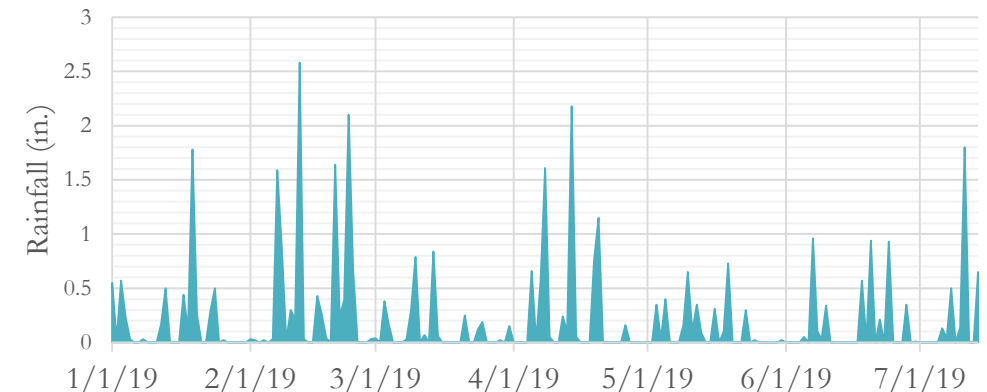
Key

- No Treatment
- TX-VA
- Cell-Tech

Jackson TN Avg. Daily Temperature



Jackson TN Daily Precipitation



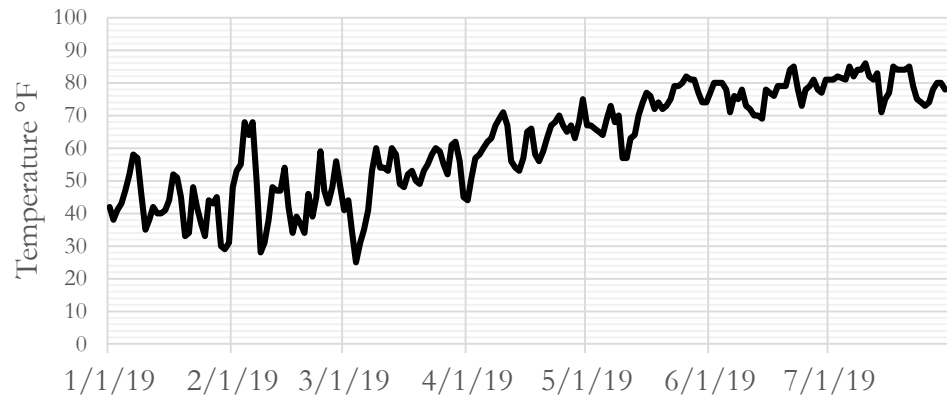


Stuttgart, Arkansas.

Planting

- 2 Treatments / 5 replicates

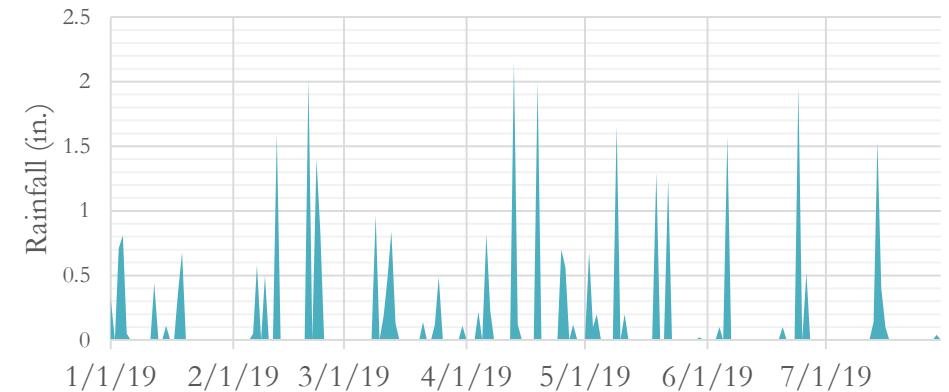
Stuttgart AR Avg. Daily Weather



B

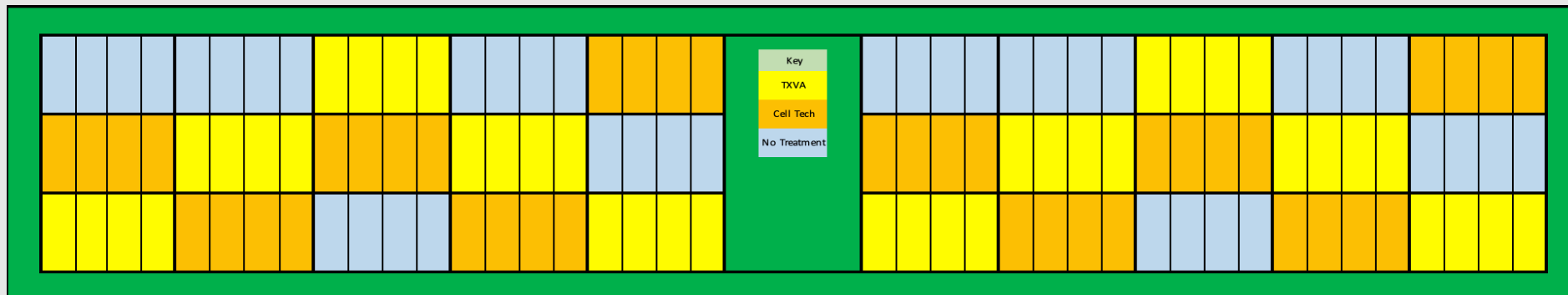
D

Stuttgart AR Daily Precipitation



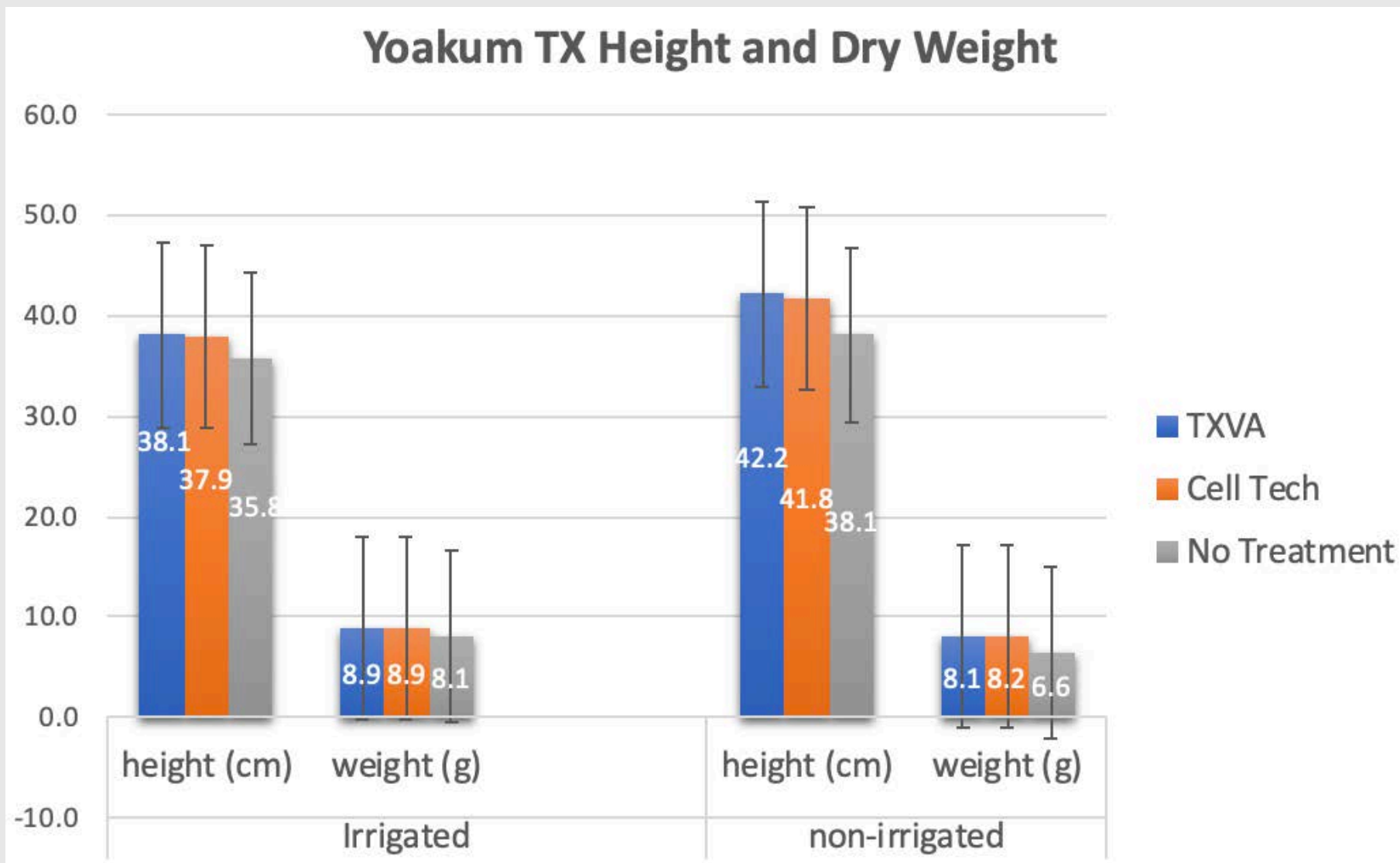
Non-Irrigated

Irrigated



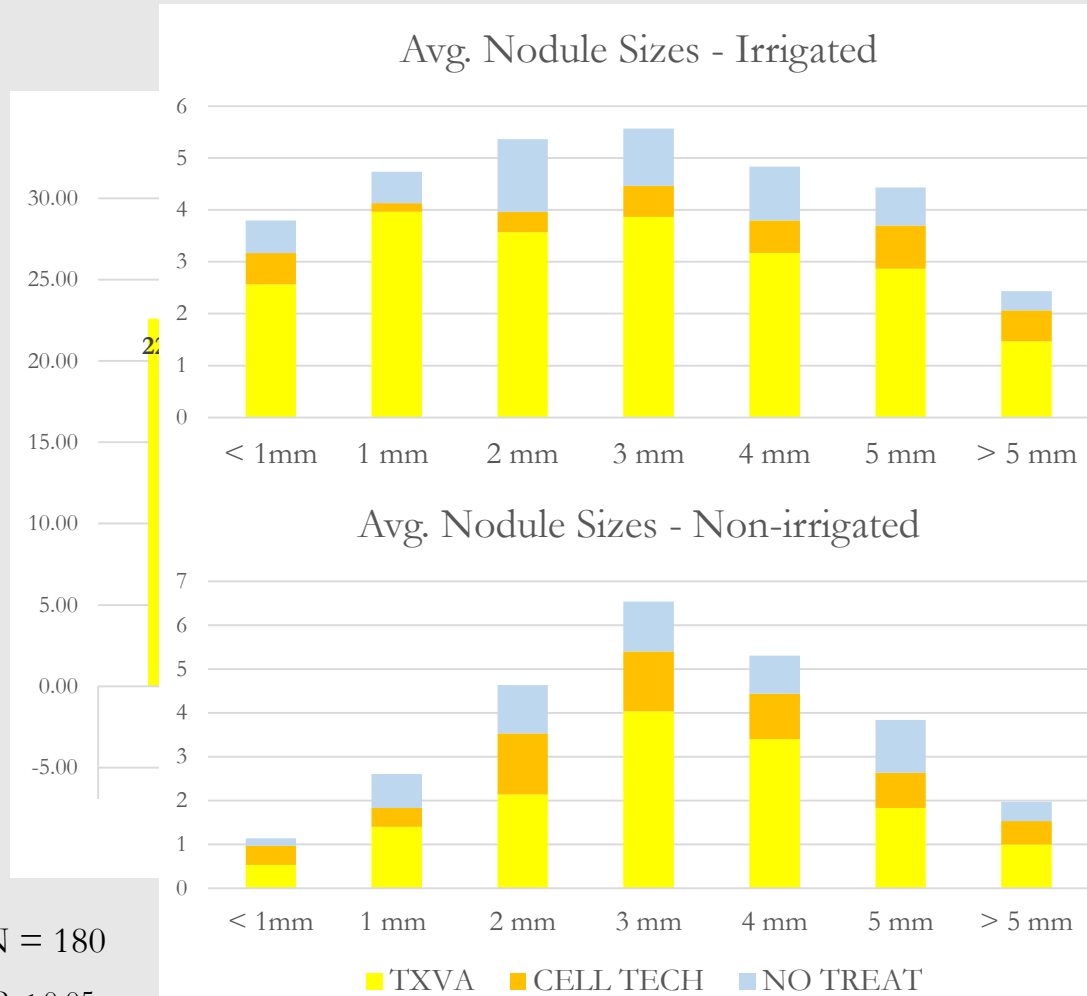


Yoakum, TX Mid-harvest





Yoakum, TX nodule enumeration



N = 180

* $P < 0.05$

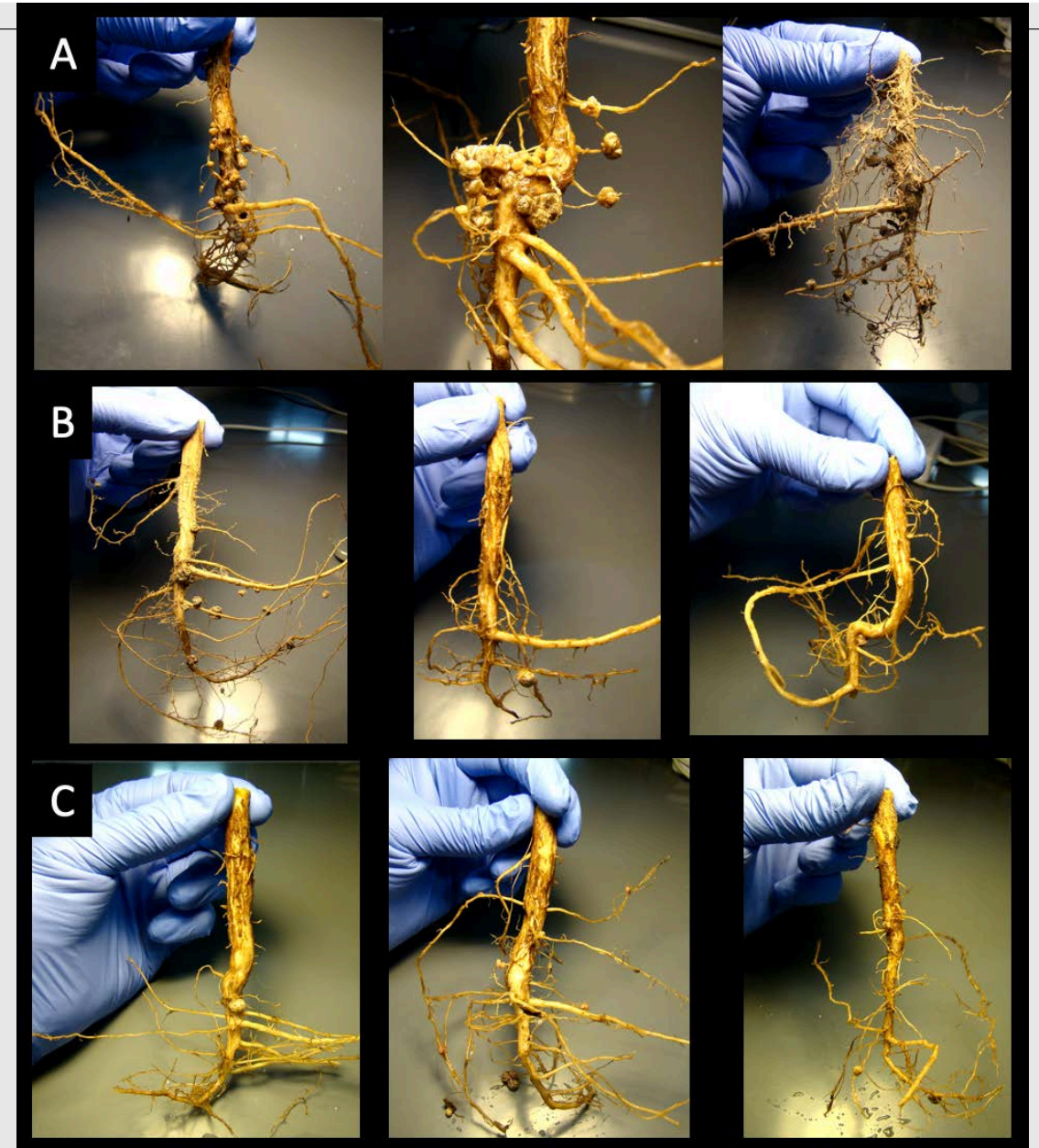


Figure 1. TXVA (A). Cell Tech (B). No Treatment (C).



Future Work

- Mid-harvest sampling remain for Stuttgart, AR.
- Finish analyzing mid-harvest data.
- Harvest - Final yield analysis
- **Contact information:**
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Questions?



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