

# New USDA-ARS Efforts in Forage Research at SJV Agricultural Sciences Center, Parlier CA

**Alfalfa and Forage Field Day**  
**September 23, 2021, UC-KAREC**

Sultan Begna<sup>1</sup>, Jason Kelley<sup>1</sup>, Dong Wang<sup>1</sup>, Khaled Bali<sup>2</sup>, Dan Putnam<sup>3</sup>, Brenda Perez<sup>3</sup>, Moneim Mohamed<sup>2</sup>, Brady Holder<sup>2</sup>, Umair Gull<sup>3</sup>, Luke Paloutzian<sup>2</sup>, and Jason Giannelli<sup>4</sup>

[sultan.begna@usda.gov](mailto:sultan.begna@usda.gov); [jason.kelley@usda.gov](mailto:jason.kelley@usda.gov)  
<https://www.ars.usda.gov/pacific-west-area/parlier>

<sup>1</sup>USDA-ARS, Parlier, CA; <sup>2</sup>UC-KARE, Parlier, CA; <sup>3</sup>UC-Davis, Davis, CA

<sup>4</sup>Wegis & Young Family Ranch, Bakersfield, CA



# Alfalfa Research Program

## Research team and capacity building:

### Dr. Dong Wang, Research Leader, WMRU

- 6 New hires started in 2020 - 2021

Drs. Sultan Begna-Res. Agronomist, Jason Kelley-Res. Ag. Eng.

Drs. Moneim Mohamed-Proj. Scientist, Pedro Lima-Eng. Tech.,

Kelley Drechsler- Ag. Eng., Robert Shenk-Eng. Tech., John Jimenez-Res. Assist.



## Research initiated

- 5 Field studies by ARS with university collaborators (variety, irrigation frequency/cutting schedule, cutting schedule/reduced-lignin varieties, on-farm SDI vs. flood irrigation Systems, and Eddy-covariance experiments).

## Collaborations established:

- Dr. Dan Putnam, U. of California Davis, CA
- Dr. Khaled Bali, U. of California KARE, Parlier, CA
- Dr. Freddie Lamm, Kansas State U., Colby, KS
- Dr. Dan Sumner, U. of California Davis, CA
- Dr. Alexander Maas, U. of Idaho, ID
- Mr. Jason Giannelli, Greg Weigis, and Mike Brandon: Wegis and Young Family Ranch, Bakersfield, CA

# Alfalfa Research Project Activities, ARS Parlier CA

## Variety

**Objective:** Growth, yield-quality dynamics, and stand persistence of 20 varieties (semi- and non-dormant, roundup ready, conv. and reduced-lignin types) under ~35D cutting schedule with full irrigation.

Planted in spring 2020. **Study location:** USDA-ARS, Parlier CA

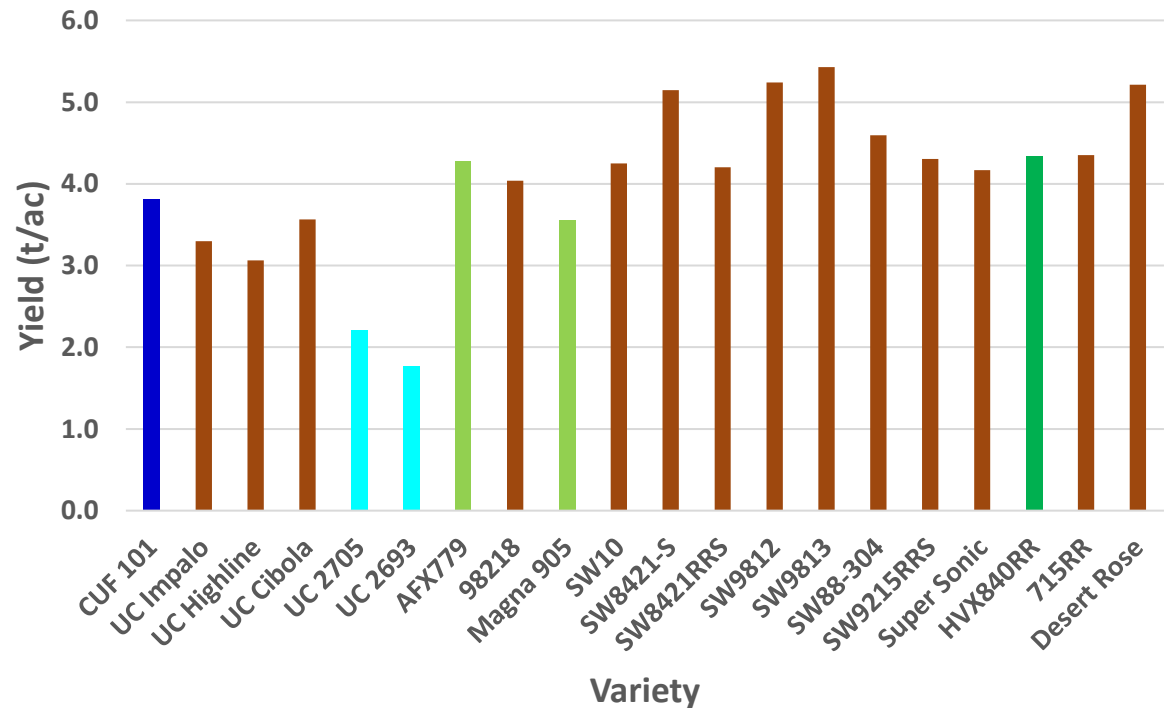


Dan and his team helped us with our 1<sup>st</sup> trial (greatly appreciated!)



**Implications.** Generating data on alfalfa growth and yield-quality relationships is critical for variety development with enhanced yield forming traits with potential to benefit alfalfa/livestock producers.

Yield Variability in 2020 (4 cuts)



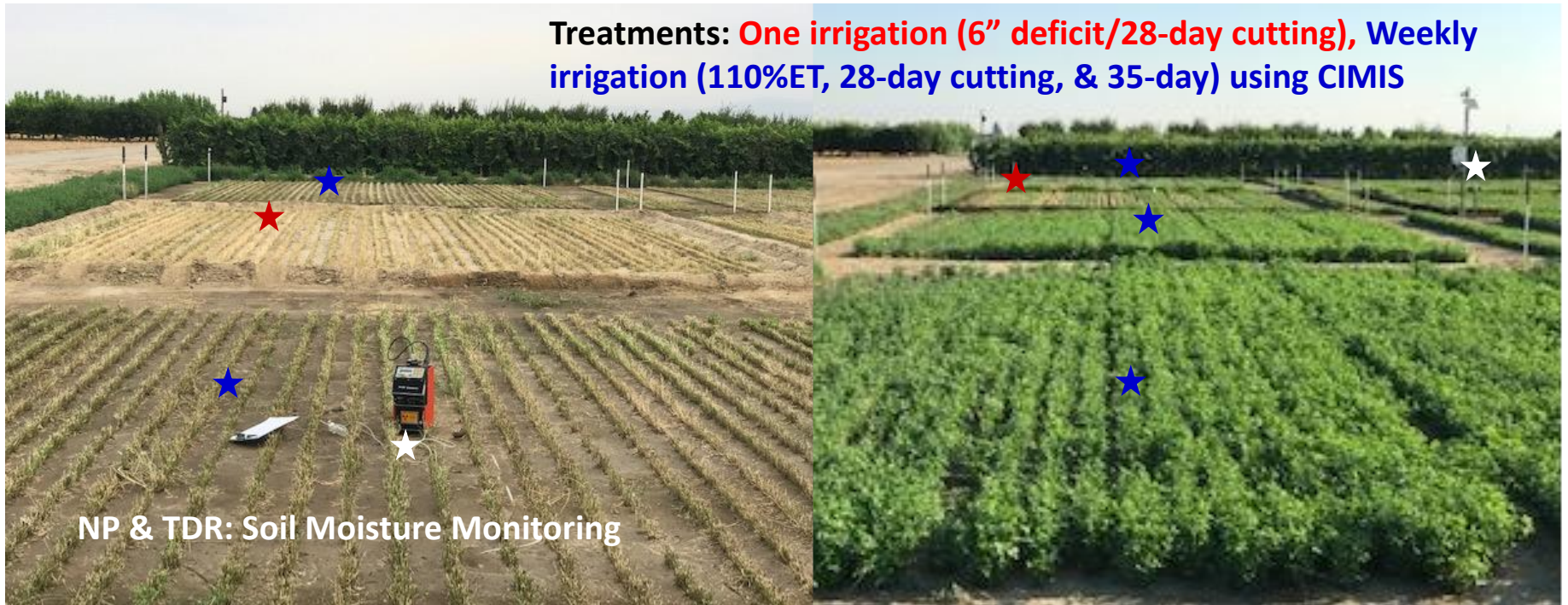
# Alfalfa Research Project Activities, ARS Parlier CA

## Irrigation Frequency/Cutting Schedule/Variety

**Objective:** Irrigation and cutting schedules effect on growth, yield-quality and water use dynamics of non-dormant reduced-lignin and conventional varieties. Generate data including from drone images for developing alfalfa forage model for yield and quality prediction.

**Study location:** USDA-ARS, Parlier CA. Planted in spring 2021.

**Treatments:** **One irrigation (6" deficit/28-day cutting), Weekly irrigation (110%ET, 28-day cutting, & 35-day) using CIMIS**



**Implications.** Identifying irrigation, cutting schedule/variety management strategies with high forage quality, yield, and water use efficient is critical for producers to sustain alfalfa production system. Developing alfalfa forage model for yield and quality prediction is also important.

# Alfalfa Research Project Activities, ARS Parlier CA

## Measuring evapotranspiration (ET) and alfalfa water use

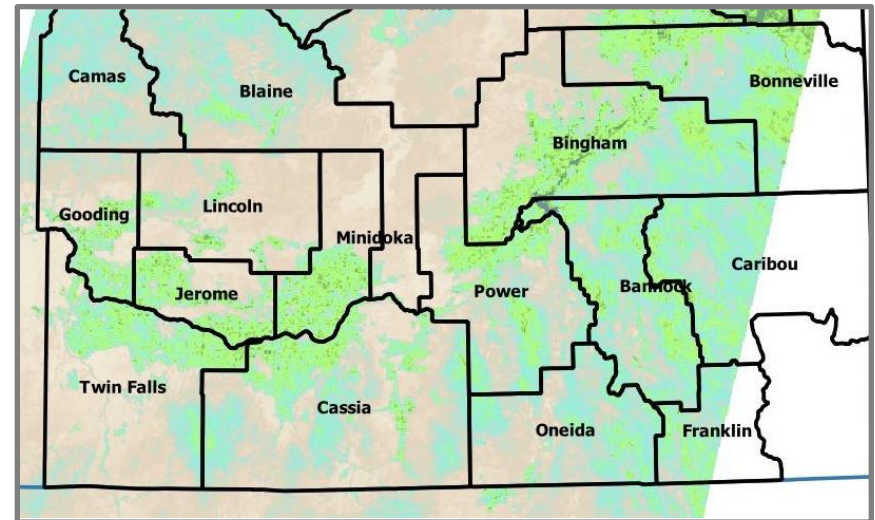


### **Eddy-covariance experiments**

Measures actual crop ET, solar radiation, and soil water content daily and every 30 minutes.

### **Satellite monitoring**

Publicly available maps of monthly ET for continental US back to 1980s.



**Implications: Understanding ET is critical because water regulation is moving towards monitoring Consumptive Use instead of irrigation efficiency or diversion.**

# Alfalfa Research Project Activities, ARS/UC-KARE Parlier CA



## Cutting Schedule/Reduced-lignin varieties

**Objective:** Determine cutting schedule and reduced-lignin varieties effect on yield, stand persistence, nutritional and economic value.

### **Treatments:**

- Three Cutting schedules (28 day, 35 day, and staggered (alternating 21/35 day))
- Eight varieties.



Planted in 9/20/2017 (Dan started and we continued in 2020 to examine 4 years of cutting schedule by variety interaction effects on the above indicated variables).

**Study location:** UC-KARE, Parlier CA

**Implications:** High yield with late and/or staggered cutting schedule while maintaining dairy quality forage using reduced-lignin varieties strategies may make alfalfa cropping system more economical and sustainable.

# Alfalfa Research Project Activities, ARS Parlier CA

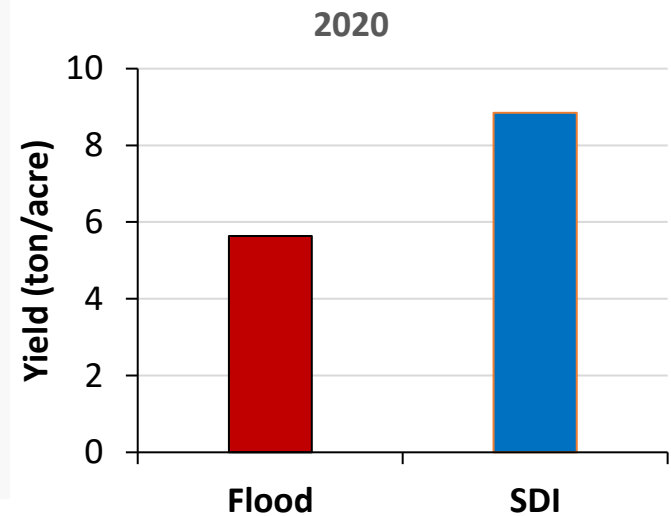
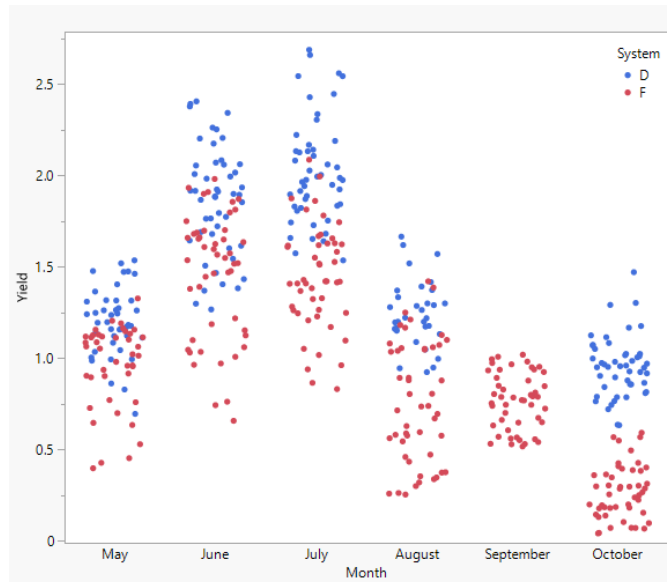
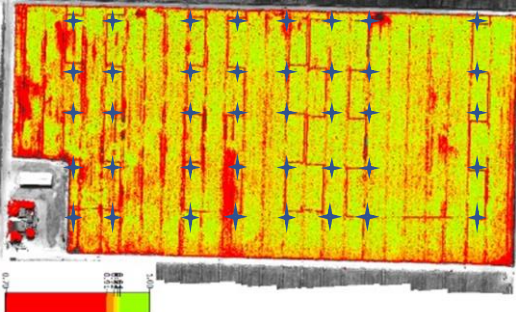
## On-Farm yield and quality monitoring and Demonstration Research

**Objective:** Assess yield, quality, and spatial variability of alfalfa under subsurface drip (SDI) and Flood (FLD) irrigation systems.

**Study location:** Weigis and Young Family Farms, Inc., Bakersfield, CA with dairy & alfalfa production.



Drone image (below) with sampling points & patterns



**Implications.** Identifying and demonstrating yield, quality, and uniformity across field & water use efficiency advantage of SDI over FLD irrigation system is critical to encourage adoption of SDI system by producers.

# Summary

- **High variability in yields were observed among varieties in 2020; and yield-quality relationships of selected varieties will be closely examined.**
- **Subsurface drip irrigation resulted in higher yield than flood system in 2020; and spatial variability in forage yield and quality of the two systems will be closely assessed.**
- **Our research efforts in agronomic and irrigation management strategies to improve alfalfa-water productivity will continue.**
- **Strengthening collaborations with regional university researchers, alfalfa/dairy producers and private industries is critical for developing sustainable alfalfa forage production systems.**

## **Acknowledgments:**

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Wegis & Young Family Ranch Inc., Bakersfield, CA

S&W Seed Comp.; Corteva agrisc.; Alforex Seeds; Forage Genetics Int.