

Season-Long Watermelon Nutrient Management Program Using Controlled Release Fertilizer

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NFREC- Suwannee Valley and Levy County Extension

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Special Thanks

- **Florida Watermelon Association**
- **FDACS Office of Ag Water Policy**
- **Harrell's Fertilizer, Jay Skillman**
- **Waters Agricultural Lab**
- **BMP Logic**
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- **Vivek Sharma**
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- **Levy County intern and technician**

Background

Suwannee River Basin of North Florida

40 Years of Plasticulture Vegetables

Deep (10-12 ft.) Sandy Soil (<1.5% OM)

Environmentally Sensitive Area

Water and Nutrient Management

Watermelon- 150 lbs/A of Nitrogen

Future- SV 4.1 Million lbs Reduction in Nitrogen



CURRENT FLORIDA RECOMMENDATIONS (BMPs) FOR DRIP IRRIGATED WATERMELON

1. Soil test
2. Lime as needed
3. All Phosphorus and Micronutrients applied in bed pre-plant (not in deep groove)
4. 1/3 of N and K applied in bed pre-plant
5. Remaining N & K fertigated to total 150 lbs/A of N, Sap test or tissue analysis to fine tune, especially in wet year
6. Terminate N&K fertigations several days prior to final harvest
7. N rate = 150 lbs/A. More, only if documented leaching rain event or low leaf nitrogen (petiole sap or whole leaf tissue)

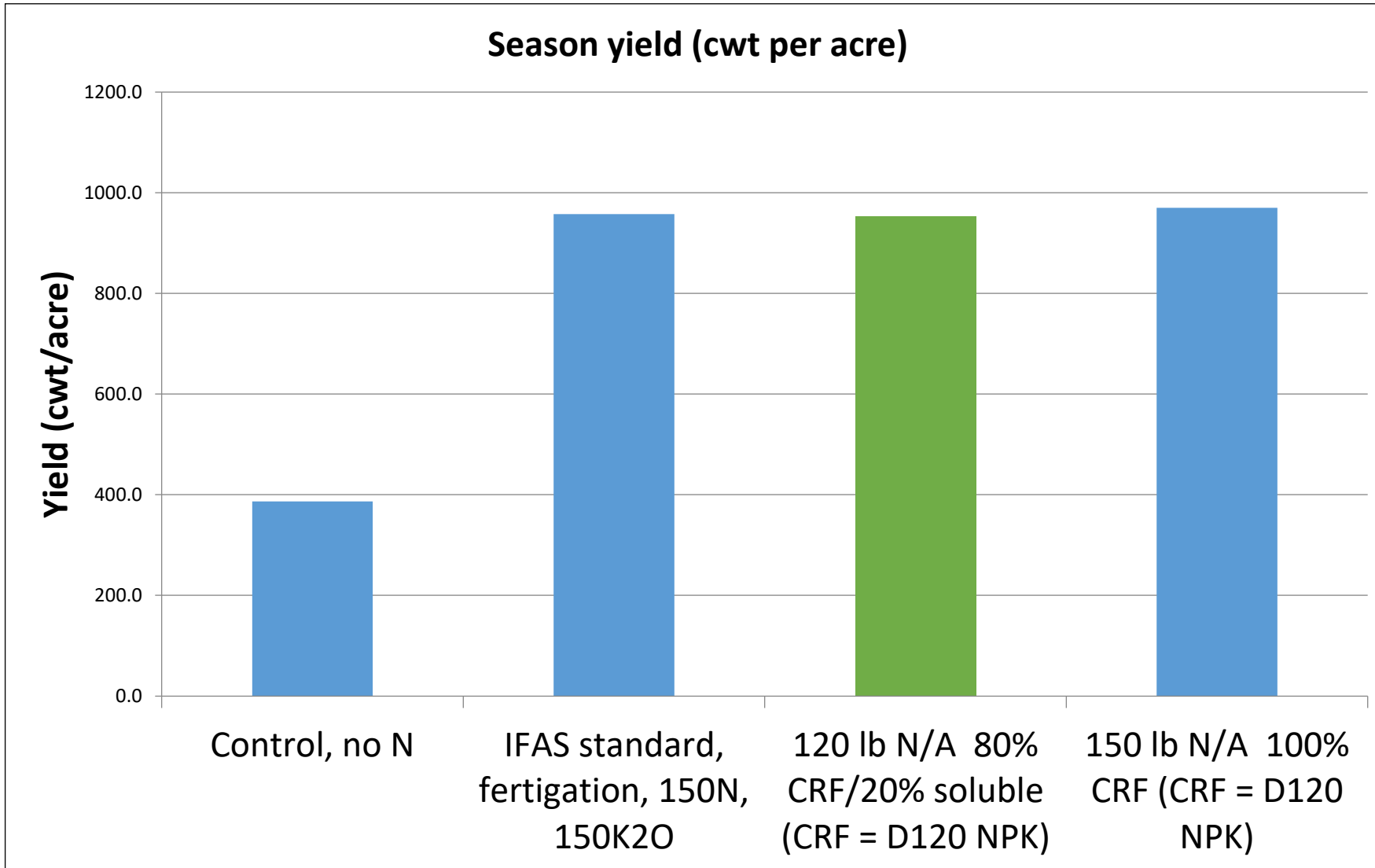


CRF Research Trials in Watermelon

Funding: FWA, FDACS, Industry, Farmers

- **4 Small Plot Trials (Live Oak and Citra)**
 - Citra 2013- CRF equal in production
 - Live Oak 2019- CRF higher early yield, equal total yield
 - Live Oak 2020- CRF higher early yield, equal total yield
 - Live Oak 2020- Excessive irrigation, similar yield with CRF, less leaching losses
- **6 On-farm field-scale Trials**
 - 2020- Farm A- All CRF preplant, no fertigations, equal yield 65,000 lbs/A
 - 2021- Farm #1- Preplant CRF plus late season fertigations, equal yield (~ 70,000 lbs/A)
 - 2021- Farm #2- Preplant CRF followed by fertigations (Fusarium high level)
 - 2021- Farm # 3- Preplant CRF plus fertigations (high irrigation, early season TP establishment issues) CRF= 72,820 higher early, and Conventional= 78,375 lbs/A better size overall
 - 2021- 2 other observational field trials, similar yield, late season fertigations

UF CRF watermelon research, not new- 2013, Citra, FL



2020 AND 2021 ON-FARM SET-UP 4 FARMS



SEASON-LONG DATA COLLECTION: SOIL MOISTURE SENSORS, WEEKLY MULTI-DEPTH SOIL SAMPLES, AND LEAF TISSUE SAMPLES



CAPABILITY FOR FERTIGATIONS IN EACH FERTILIZER SECTION



YIELD DATA COLLECTION USING ACTUAL HARVEST CREW CUTTERS



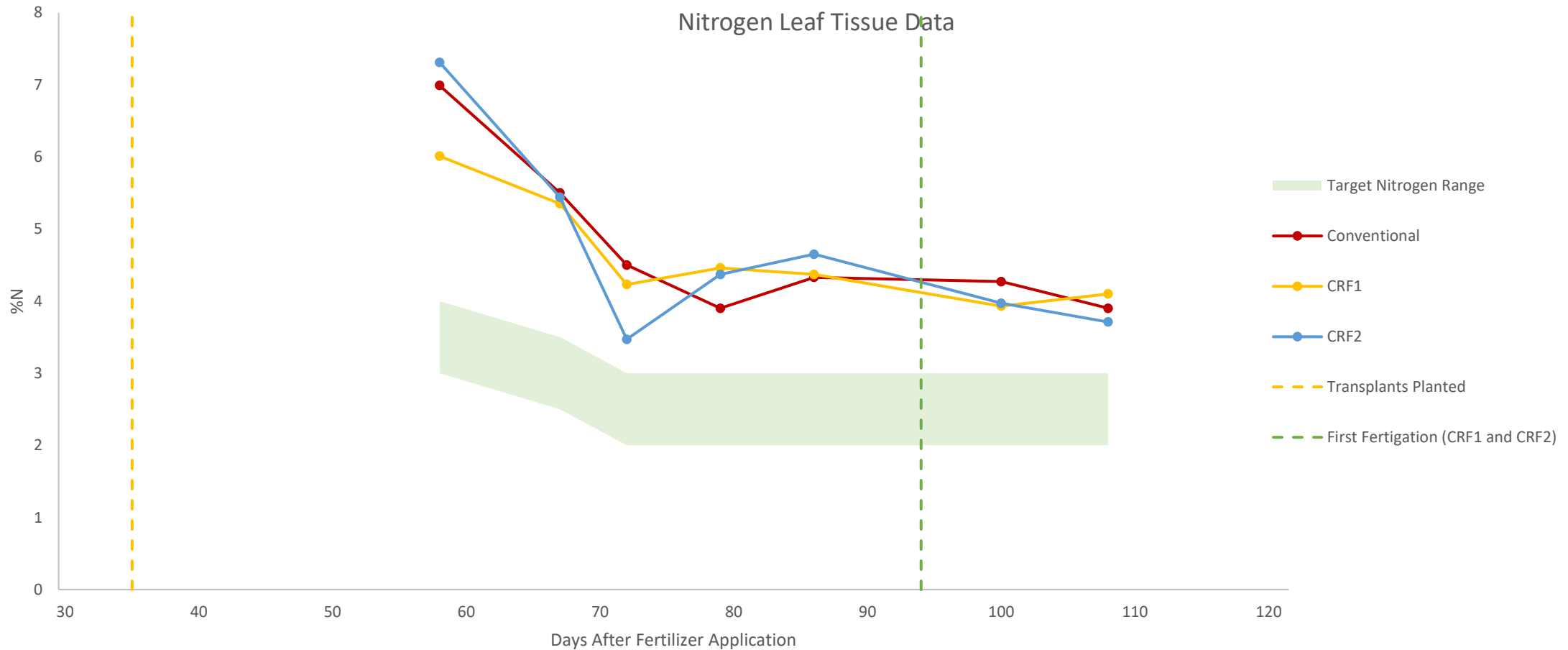
MONITORING IN-SEASON PLANT NUTRIENT STATUS



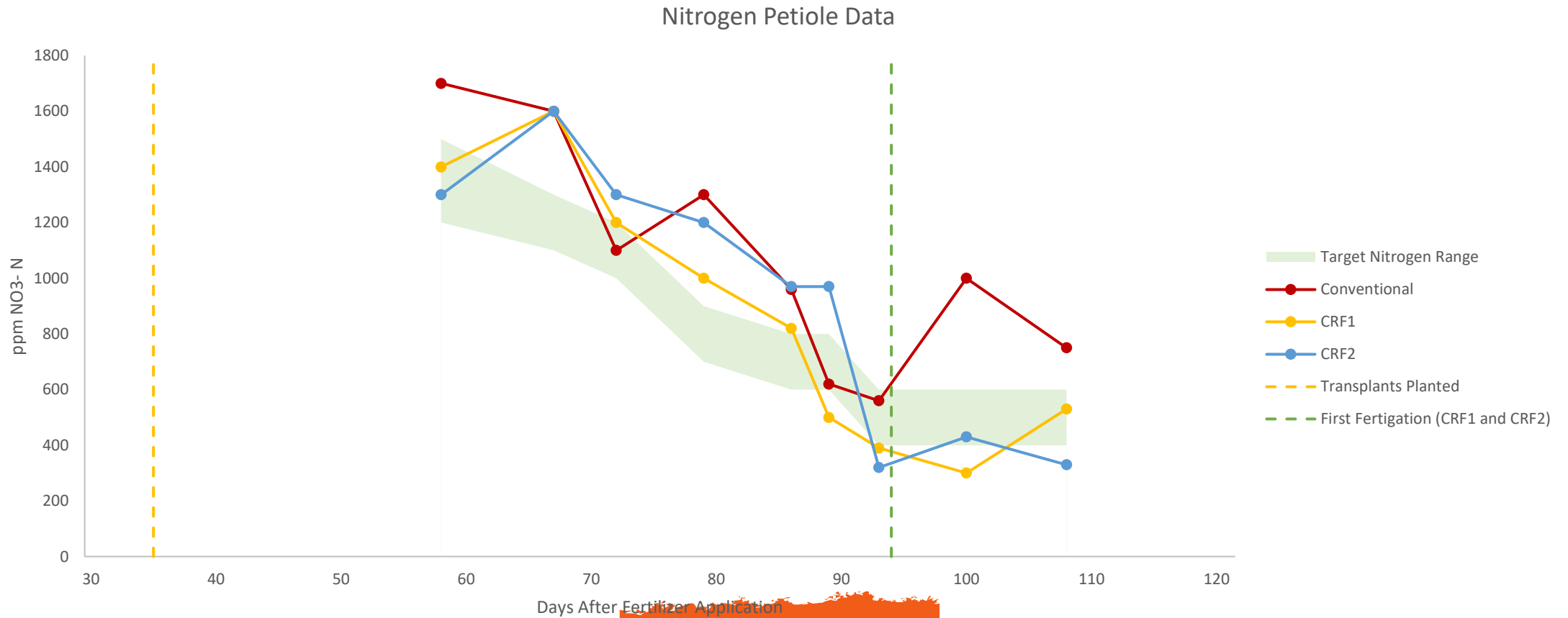
- Traditional dry leaf analysis (whole leaf including petiole)
- Fresh petiole-sap testing (petiole only)
- Both use most-recently-matured leaf



LEAF TISSUE NITROGEN



PETIOLE SAP NITROGEN

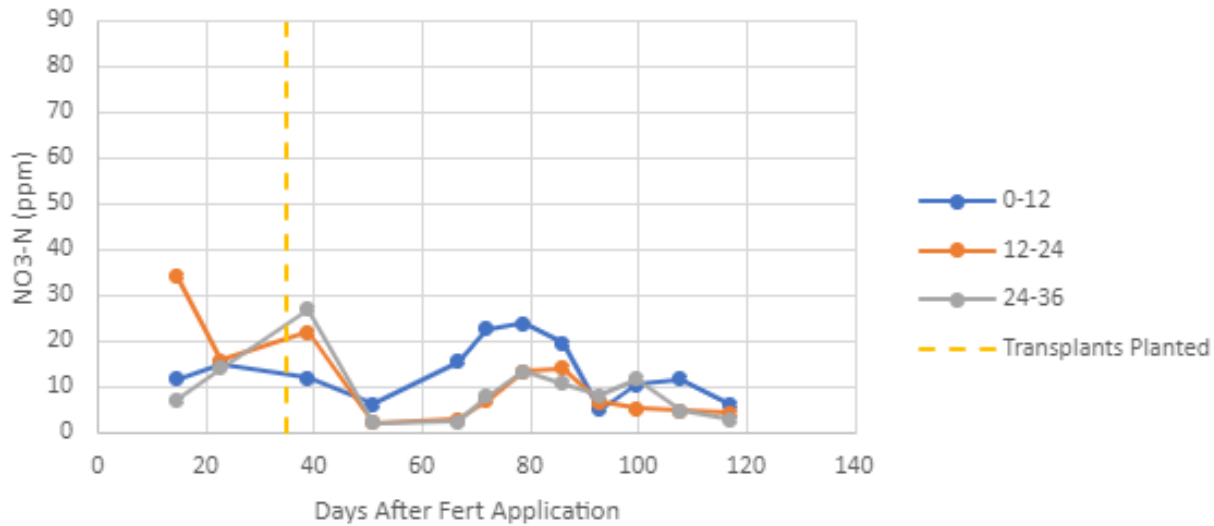


ON-FARM YIELD DATA

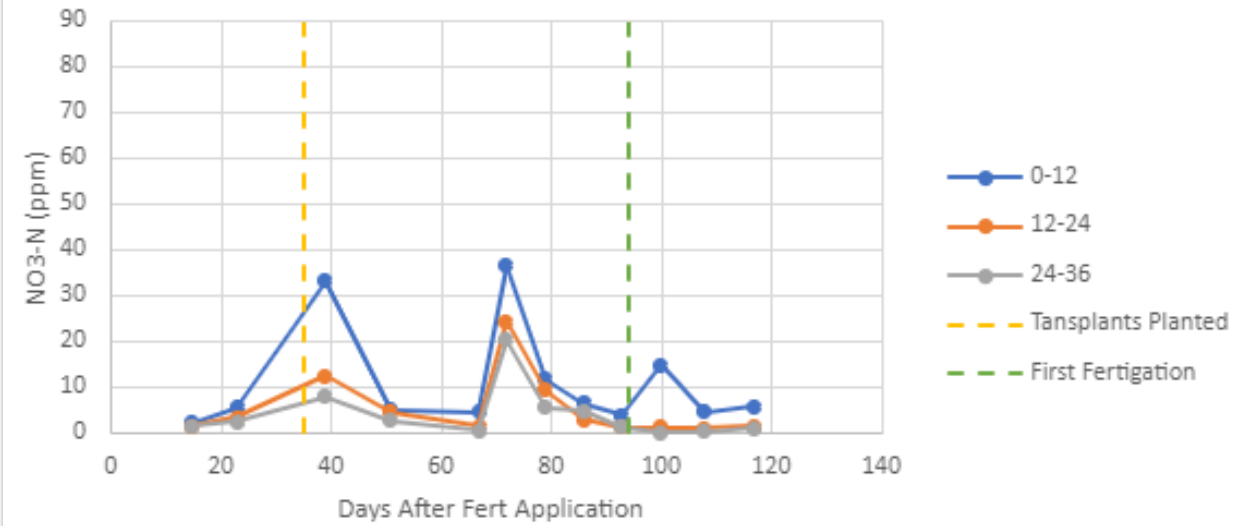
2021 Farm Harvest Data			
	Total Yield (lbs/acre)	Average Fruit Weight (lbs)	# Melons/Acre
CRF1	73,058.83	15.61	4,681.25
CRF2	66,542.26	14.73	4,518.62
CONV	71,461.63	15.65	4,565.09

SOIL NITRATE-N LEVELS (FOCUS ON GRAY LINE)

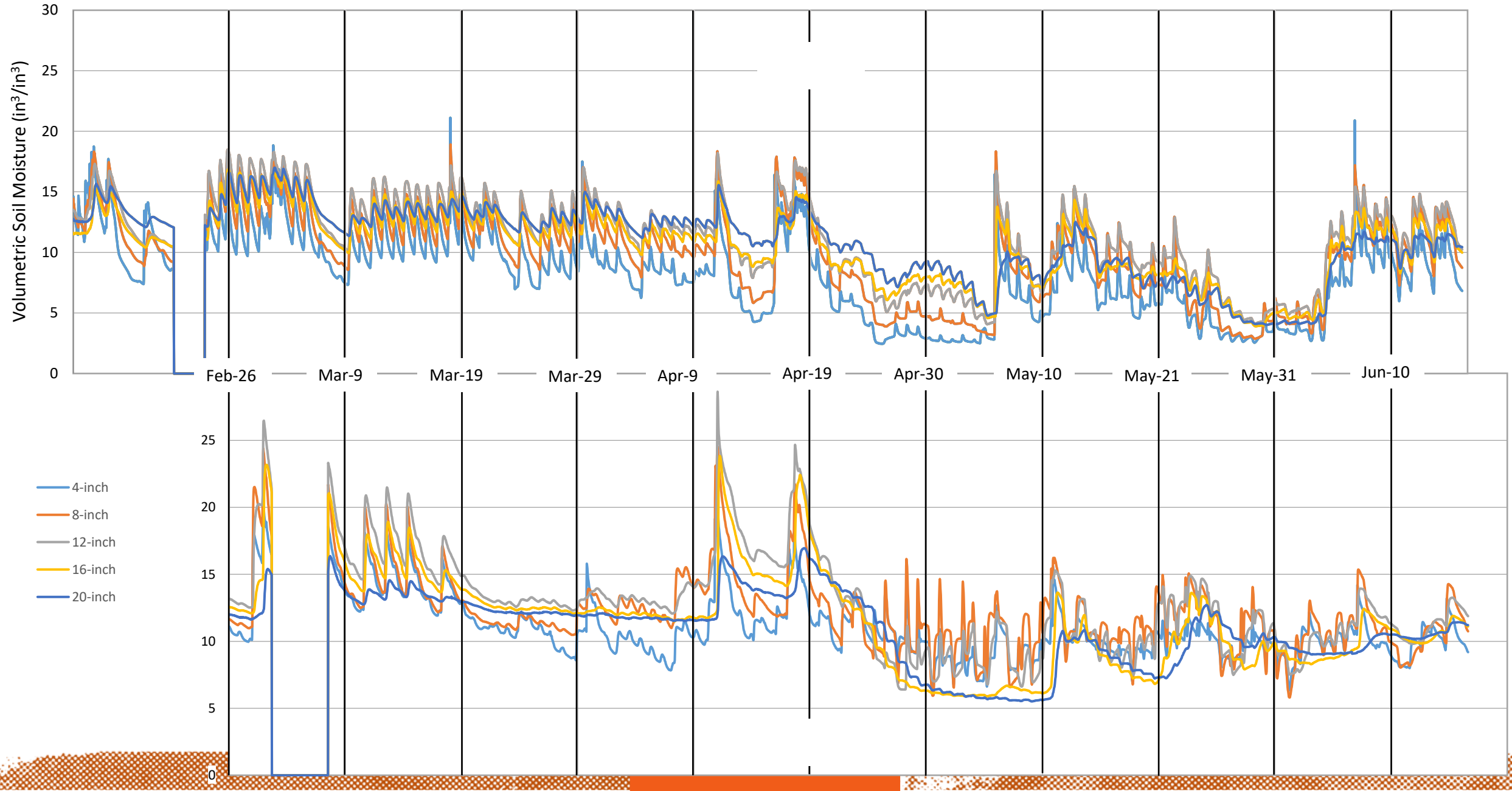
CONV



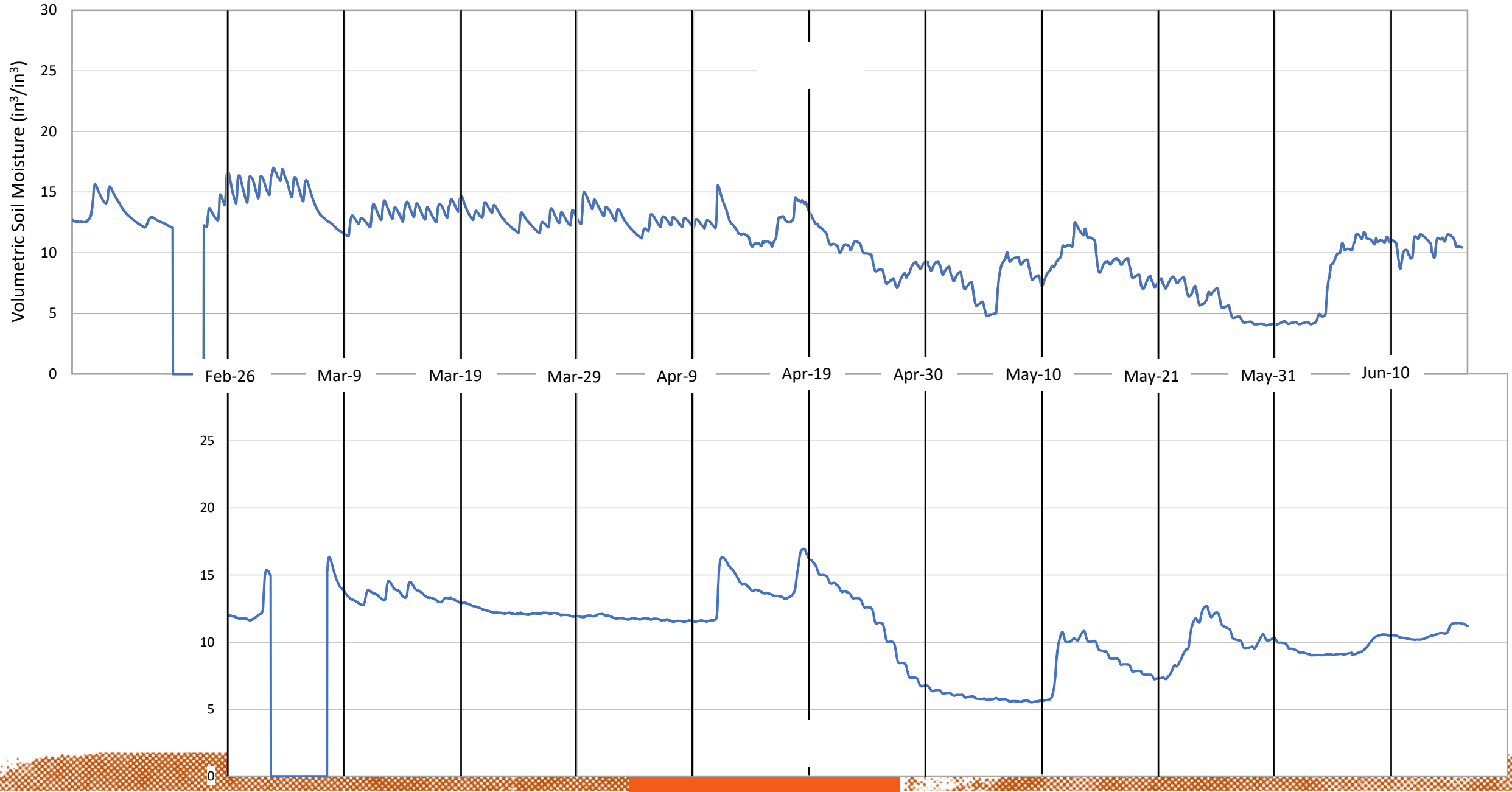
CFR1



BMP Logic Soil Moisture Data

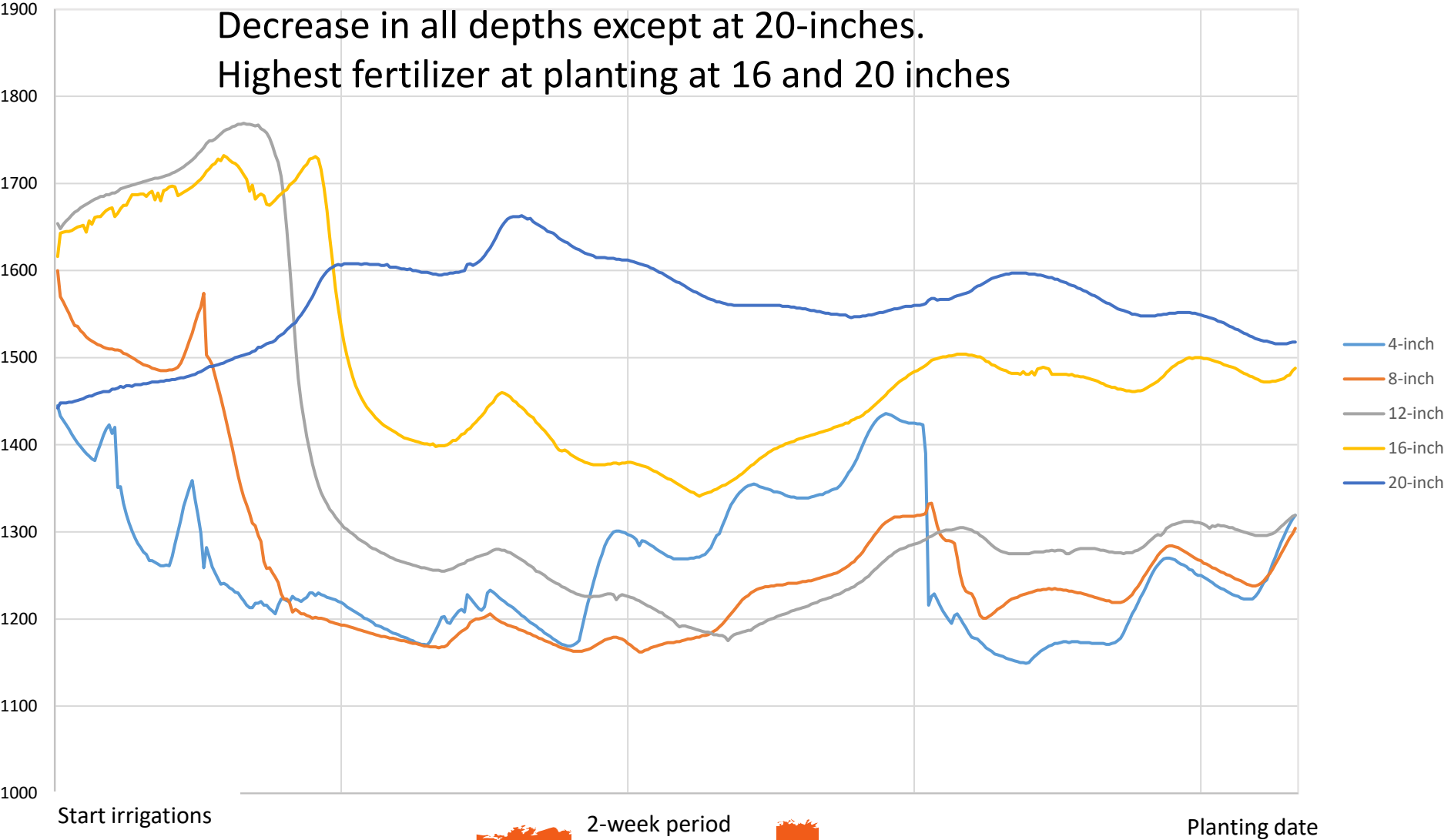


20-inch Soil Moisture Data

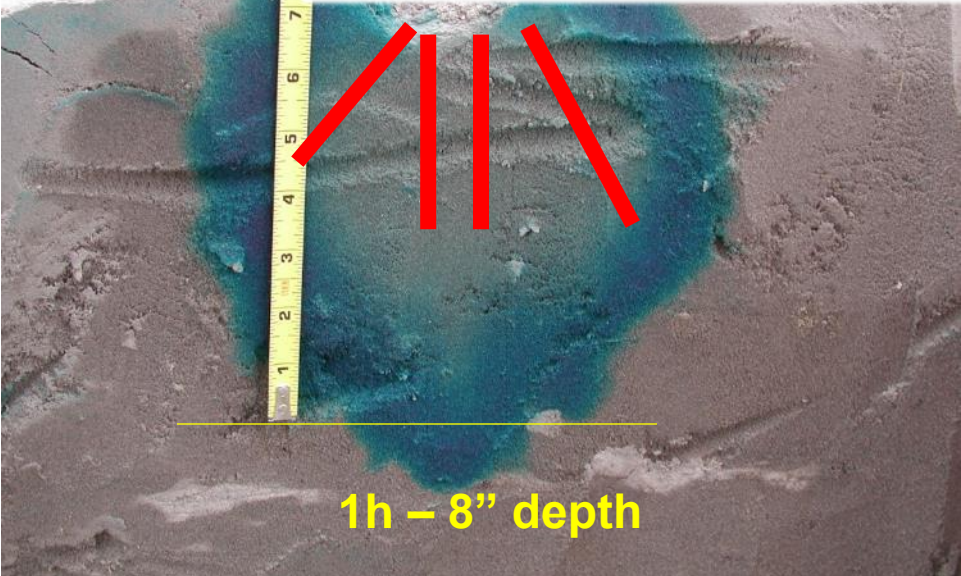


Salinity Measures Pre-plant Conventional Fertilizer

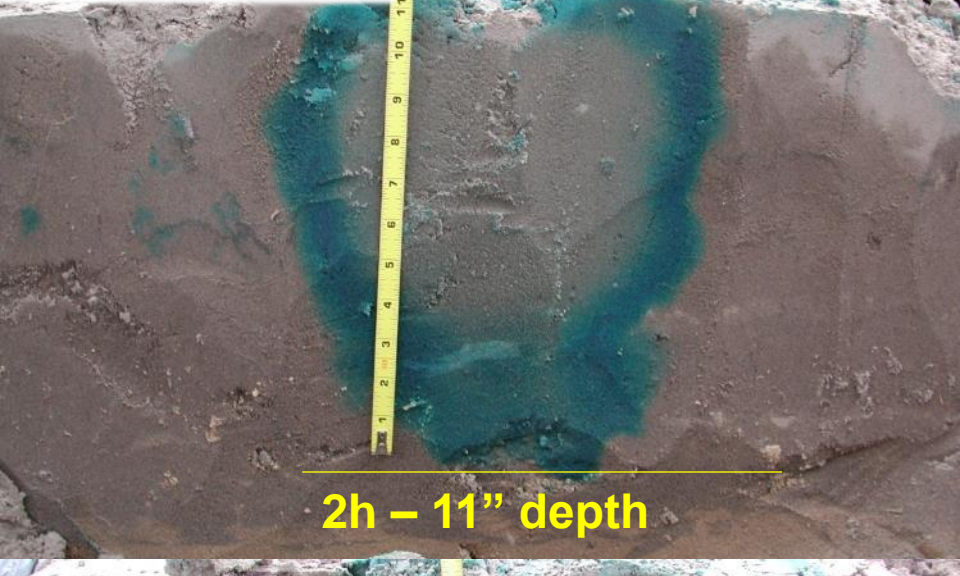
Decrease in all depths except at 20-inches.
Highest fertilizer at planting at 16 and 20 inches



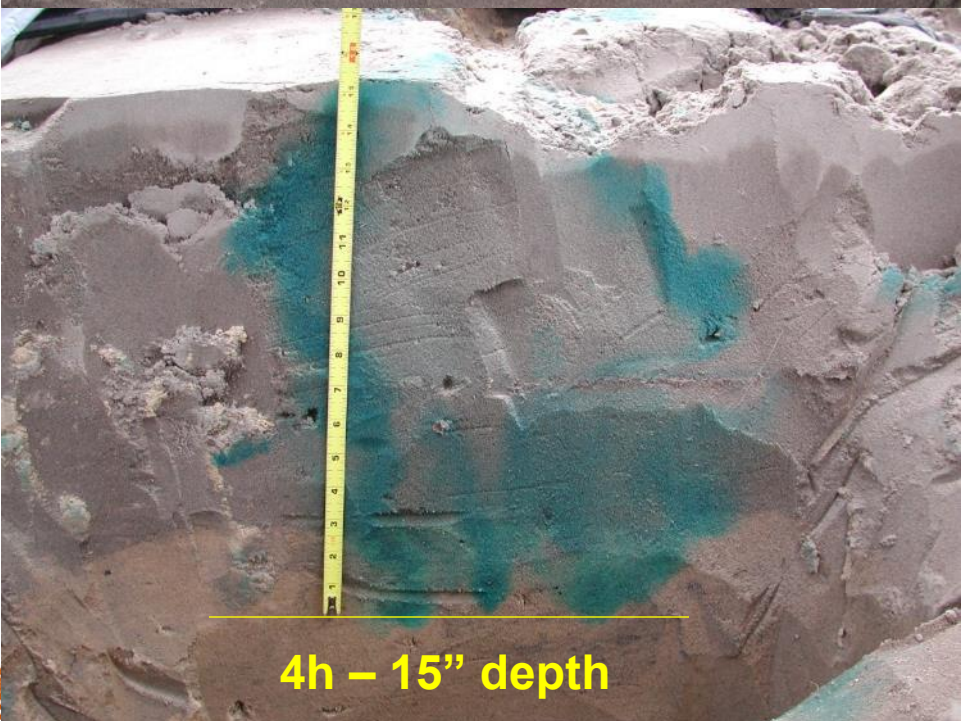
Ro-Drip 12-inch emitter spacing, 24 gph/100ft



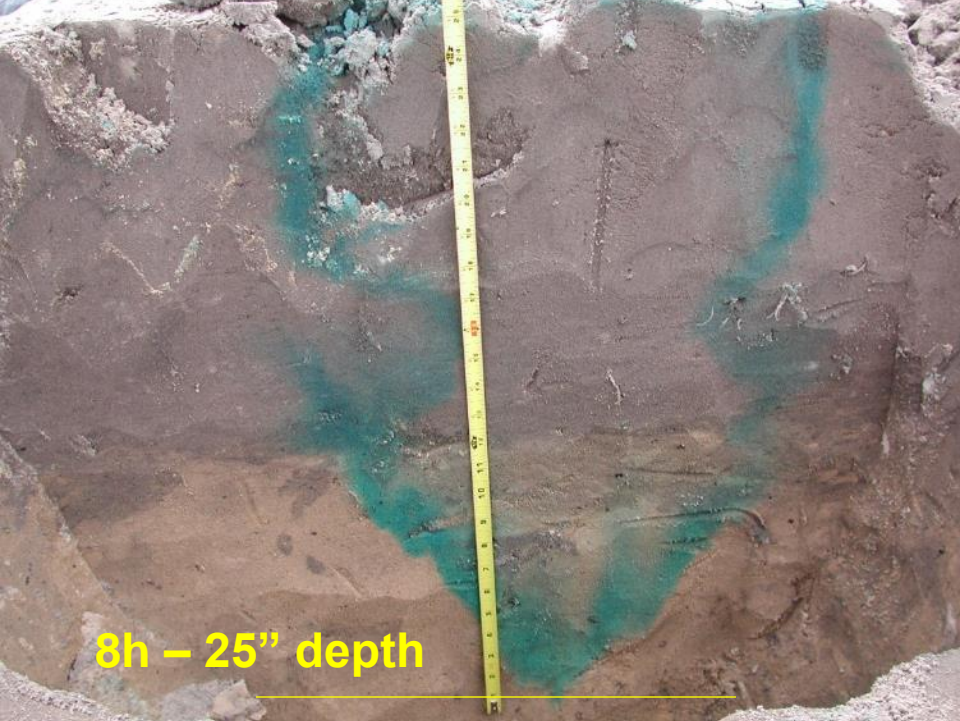
1h – 8" depth



2h – 11" depth



4h – 15" depth



8h – 25" depth

WHAT HAVE WE LEARNED?

1. **FDACS BMP nitrogen rate for watermelon is 150 lbs/A. Based on current IFAS rate.**
2. **Nitrogen losses due to leaching are greatest early in the season. Losses are much greater with conventional sources of nitrogen.**
3. **Depending solely on one pre-season application of CRF nitrogen is very optimistic.**
4. **Could we use 80% N in preplant CRF and trigger late season fertigations based on leaf or petiole sap?**
5. **CRF has resulted in equal seasonal yields and occasionally higher early yields compared to conventional fertilizer programs when irrigation is managed efficiently.**
6. **Nitrogen losses from CRF can occur when overirrigated, a small amount each time, reducing available N to the root system.**
7. **Any fertilizer program (conventional or CRF) must be used in conjunction with good irrigation management.**

Economic Takeaways

1. Controlled release fertilizer (CRF) is more expensive, pound for pound, than uncoated fertilizer.
2. The cost difference is lessened, if ...
 - A. The uncoated fertilizer program uses extra N (above IFAS recs) because of leaching or inefficiencies.
 - B. Growers avoid costs of fertigation labor & equipment by using CRF.
 - C. Controlled release nitrogen only is used in place of uncoated pre-plant N.
3. Possible higher yield or earlier harvest could increase revenue as seen in one trial in 2019 and 2020.
4. Should the added cost of CRF be shared by public via **cost share programs** to incentivize the practice?

THANK YOU

Bob Hochmuth and Mark Warren

and other UF/IFAS

Suwannee Valley Extension Agents,

Tatiana Sanchez, Tyler Pittman