

Patrick Troy¹ and Joel Love¹

¹Suwannee Valley Agricultural Extension Center, University of Florida/IFAS, Live Oak, FL. 386/362.1725. ptroy@ufl.edu

Background

Driven by the proposed 2016 Basin Management Action Plan (BMAP) for the Suwannee River Basin, strong emphasis is being placed on irrigation and nutrient management in the area. All farmers in the region will be encouraged by the Florida Department of Agriculture and Consumer Services (FDACS) to enroll and implement in Best Management Practices (BMPs) with a goal of reducing the overall nutrient footprint from farming according to the Florida Department of Environmental Protection (DEP 2016).

Research Methods

Using a varietal trial of 12 advanced corn hybrids, an 8-fold stacked-package of BMPs were implemented in Live Oak, Florida, to prove the concept that both high yield and conservation can be achieved at the same time. The 8 practices included *covercropping, soil sampling, poultry litter applications, crop nutrient budgeting, soil moisture sensor installation, ear leaf tissue sampling, side dress fertilizer application, and pivot nozzle upgrade/calibration (via Mobile Irrigation Lab).*

Results

We achieved an average 220 bushels per acre as statwide grain corn production averages 122 bushels per acre (NASS 2012). Considering our applied N inputs were 246 lbs, an efficiency conversion ratio/ Nitrogen Use Efficiency of 89% was achieved. With many local farmers applying twice as much nitrogen (with conversion ratios ranging from 60-80%), much of the added fertilizer may be subject to loss.

Growers must consider many site-specific decisions when choosing a variety, among them machinery setup, plant populations, soil potential, weather events, irrigation efficiency, and others. The checklist below is by no means is the only or best way to begin your decision making, but it's a start.

1. Choose your traits: Most commercial corn varieties are Roundup Ready®, which allows for glyphosate use. Some varieties have been commercialized with the Liberty Link® trait, which allows for post emergence use of Liberty®.
2. Choose your maturity class: North Florida has more consistent rains and favorable temperatures in spring that favor short (<110aGDD) and mid-season (110-120aGDD) varieties.
3. Choose your population: Depending on your machinery set up and level of risk, some varieties perform well under high plant populations and intense management.
4. Plan your irrigation: Dryland corn in sandy soils is extremely risky in variable weather conditions. BMP suggestions about close monitoring soil available water through below-ground sensors helps better schedule amounts and timing. Optimal yields are achieved when both fertility and water are micromanaged to coincide with plant uptake. Some varieties are more durable under sub-optimal management. Be cautious about pursuing high yields if you are not able to stomach the risk.
5. Monitor nutrient levels: Plant tissue analysis by way of whole plants (early) or ear leaf will show what the corn crop is taking up by way of macro nutrients. Comparing these with accepted sufficiency ranges will ensure that adequate fertility management. Nitrogen is one of the most limiting factors, but leaf concentrations above 4% N @ seedling, 3.5% N @ V3, and 2.76% N @ silking are considered not available for plant uptake.
6. Nitrate loading/leaching can impair water quality when a heavy rain event occurs- defined as 3" in 3 days or 4" in 7 days according to the BMP Vegetable and Agronomic Crops Manual, pg. 33 (FDACS, 2016).

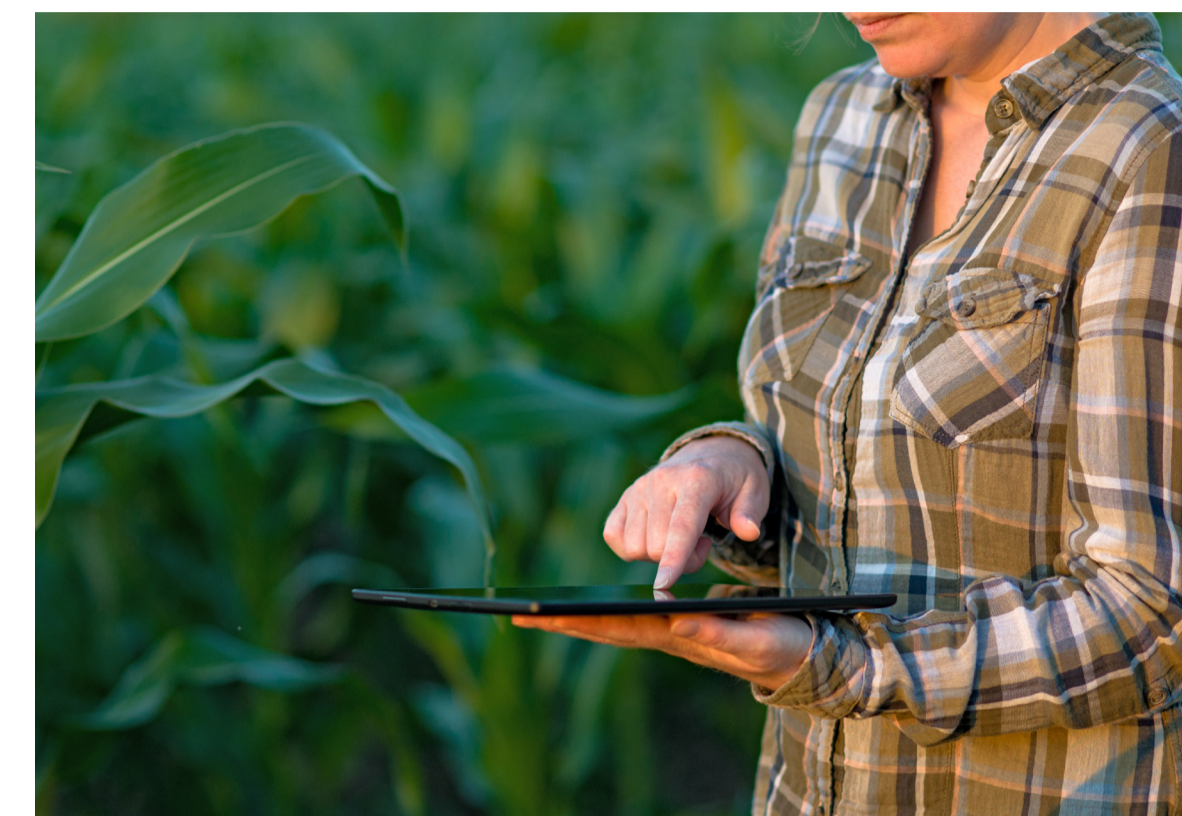


Table 1. Yield of 12 Hybrid corn varieties grown using best management practices (BMPs) in Live Oak 2016

Company	Hybrid	Yield (bu/ac)	SE
Cropland	6640vt3/p	244	14.3a
Dekalb	66-97	234	14.3a
Dynagro	CX16118	234	3.6a
Dynagro	D57VP51	232	14.3a
Pioneer	1197YHR	226	14.3ab
Syngenta	N83D-300GT	218	14.3ab
Cropland	5290dgvztzp	217	14.3ab
Terral	REV 25BHR44	215	14.3ab
Pioneer	1916YHR	211	14.3ab
Syngenta	N76A-3000GT	209	14.3ab
Dekalb	62-08	205	14.3ab
Terral	REV 28HR20	199	3.6b

Figure 1. Comparison of Nitrogen leaf concentrations from grower and reduced (IFAS) treatments

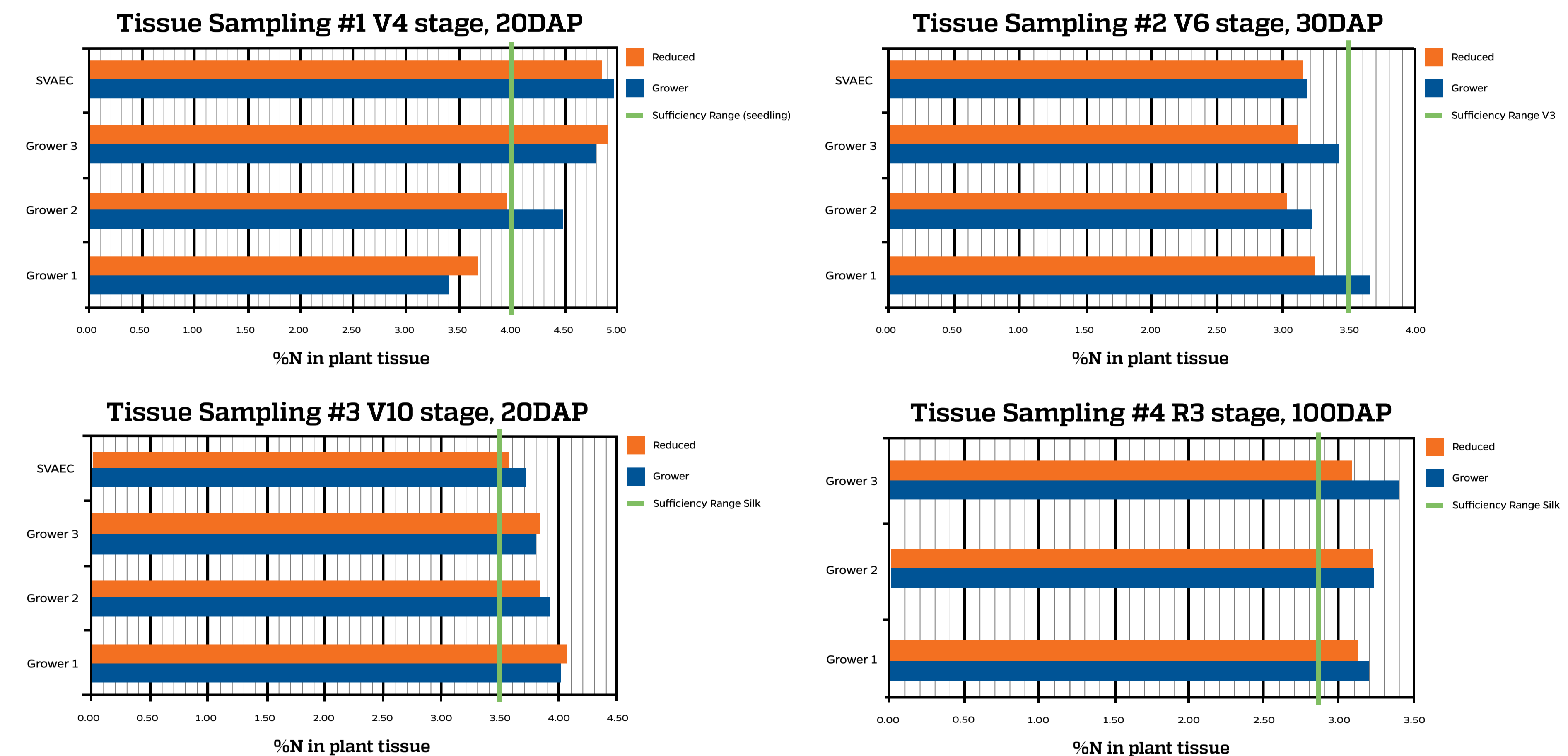
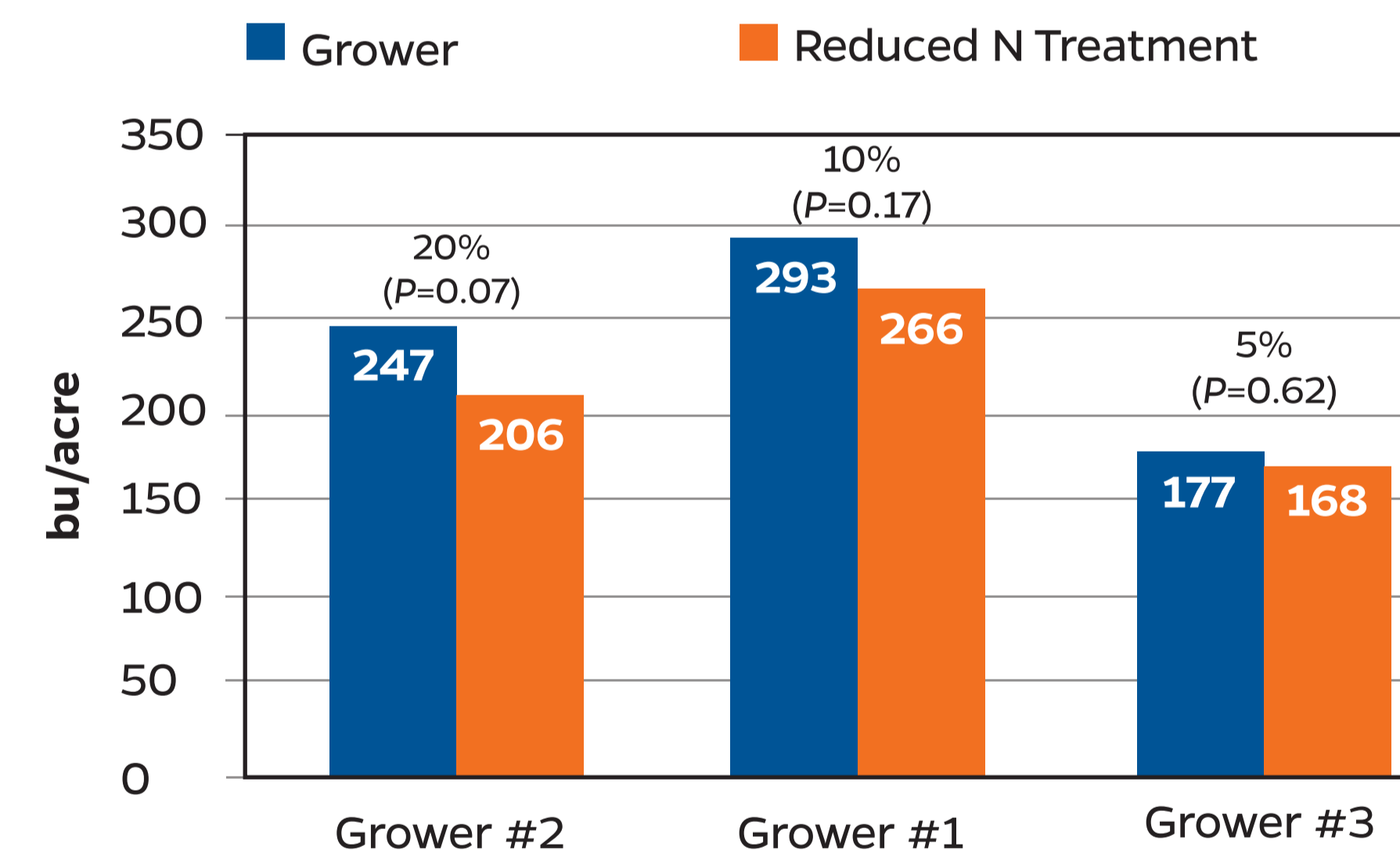


Figure 2. Yield effect of 2 nitrogen rates for 3 growers



Conclusions and Future Direction

- High yields are possible with proper attention to the source, timing, rate and placement of water and nutrients.
- Additionally, water savings of approximately 8% were recored through close monitoring of volumetric water content at various depths in the soil profile with a Sentek TDR probe. Total water applied throughout the season was 15 inches.
- Full implementation of BMPs allowed for reductions of inputs overall and approximately \$95 saved/acre.
- Following the BMPs outlined in this trial could be one way to reduce production risk and maximize profit without endangering water quality
- Expanded on-farm research is needed to document where high yields and nutrient savings (from leaching and expense) are possible.
- Formal IFAS Nitrogen recommendations for irrigated corn with newer hybrids need to be revisited with replicated trials
- Quantifying the economics and environmental services of BMPs now could encourage early adoption and greater financial success.

Acknowledgements:

Completion of this BMP varietal trial was only possible through a collaborative effort by various partners and funding agencies including: FDACS and their office of Ag Water Policy, Mayo Fertilizers, Live Oak's Farmers Cooperative, seed donations from Syngenta, Dekalb, Dupont/Pioneer, Winfield, Cropland, Terral Seed, Dynagro, Sentek provider BMP Logic, Holder Ag Consulting, and the farm team at the SVAEC, led by Ben Broughton.