BMP success story

Overcoming Production Challenges with a New Peanut Variety

De Broughton, Regional Specialized Agent - Northeast

In 2017, the "peanut collapse" affected more than 25,000 acres peanuts in the lower Suwannee River basin and reduced the region's peanut crop by 50%. The dominant variety used at the time produced acceptable yields but was known to have moderate to poor germination and plant vigor issues. The "peanut collapse" occurred from the plant shutting down before harvest. Near harvest time, stems were dried and decayed, making harvesting the pods difficult. The variety was blamed for not being hardy enough to proliferate through the stress. In 2018, after participating in several local extension programs where new variety data were presented, Mr. J., a Suwannee Valley peanut farmer, became interested in trying one of the new varieties discussed in the meetings. He and I discussed the pros and cons, and I organized a meeting between he and the UF/IFAS peanut breeder. The variety of interest, 'FloRun 331', was a new UF variety.

In 2018, Mr. J. was greatly affected by the collapse of the previous season and decided to test 300 acres of 'FloRun 331'. The results were phenomenal, providing an average yield increase just over 1,519 pounds or 25% per acre. As a result, Mr. J. and other producers across the Suwannee Valley, expanded plantings of this new variety in 2019.

These types of early adoptions are a direct result of extension educational efforts and the collaborative work between Suwannee valley extension, UF peanut breeding program, and a producer. These plantings of this new variety should result in boosted regional yield averages and improved farm sustainability. In 2019, there were an estimated 3200 acres of 'FloRun 331' planted in the Suwannee valley resulting in an average yield increase of ~21% or 1344 tons of peanuts. At $.21/ pound, the economic impact of this early program was $564,480 with an even greater impact expected in 2020.

Literature to consider for improving nutrient use efficiencies

Tom Obreza, Interim Dean and Director, UF/IFAS Extension

An analysis of 44 scientific research papers showed:

1. Irrigating to match crop needs reduced N leaching by 80% without losing yield.
2. Improved fertilizer management reduced N leaching by 40%. (The 4Rs concept.)
3. Using cover crops reduced leaching by 50%.
4. High tech fertilizers also decreased N leaching but were the least effective strategy.

Meta-analysis of strategies to control nitrate leaching in irrigated agricultural systems and their effects on crop yield

Highlights:

- Meta-analysis of irrigated cropping systems strategies to control nitrate leaching.
- Adjusting water application to crop needs reduced nitrate leaching by 80%.
- Improved fertilizer management reduced nitrate leaching by a mean of 40%.
- Replacing a fallow with a non-legume cover crop reduced nitrate leaching by 50%.
- Fertilizer technology was the strategy least effective in reducing nitrate leaching.

Read more here

Water and Nitrogen Budget Dynamics for a Maize-Peanut Rotation in Florida

Highlights:

- DSSAT simulations of final N uptake, biomass, and yield for a maize-peanut rotational field experiment with three irrigation treatments and three N fertilizer rates had good performance for the irrigated treatments (average nRMSE of 9%) but greater error for the rainfed treatments (average nRMSE of 15%).
- Experiments and DSSAT simulations demonstrated that N fertilizer and irrigation applications were reduced by 26% and 60%, respectively, when using a 247 kg N ha^{-1} fertilizer rate and a sensor-based irrigation schedule rather than conventional practices of 336 kg N ha^{-1} and a calendar-based irrigation method, with no impact on yield.
- Simulations demonstrated that N leaching during the crop rotation was reduced by 37% when an N fertilizer rate of 247 kg N ha^{-1} and sensor-based irrigation scheduling were used versus conventional practices.
- Soil N increased (=15 mg kg^{-1}) when maize and peanut residues decayed and then leached during the fallow season. Cover or cash crops planted immediately after the maize and peanut harvests have potential to take up this N and reduce leaching.

Read more here

Modeling Soil Nitrate Accumulation and Leaching in Conventional and Conservation Agriculture Cropping Systems

Highlights:

- Model performance was judged satisfactory, and the results provided insights on water and nitrogen balances for the two different agricultural practices tested here.
- While water balance and retention time in the vadose zone were similar in the two plots, nitrate leaching was less pronounced in the plot amended with compost due to a higher denitrification rate.
- This study provides clear evidence that compost addition and no-tillage (conservation agriculture) can diminish nitrate leaching to groundwater, with respect to standard agricultural practices.

Read more here

Modeling nitrate leaching using neural networks

Highlights:

- Simulation results indicated that:
- Sub-irrigation with a 0.5 m water table depth could reduce nitrate leaching to negligible levels.
- Intercropping com with ryegrass could reduce nitrate leaching by 50%.
- The application of more than 180 kg N ha^{-1} of fertilizer may cause excessive nitrate leaching.

Read more here

Nutrient Management Strategies

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