

# Evaluation of cover crop practice in peanut production system

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## BACKGROUND INFORMATION

Objective? – Evaluate the effect of cover crops on peanut stand establishment, yield, and soil health indicators.

When? – 2021

Where? – Vernon, TX

Previous crop? - Cotton

Soil texture? – Miles sandy loam

Planting date? – Cover crop in November 2020

Peanut (Span17) on May 14, 2021

Cover crop termination? – April 2020 by glyphosate followed by discing

Cover crop treatment? – Table 1

Peanut harvest date? – Dug on October 8 and harvested on October 20

**Table 1.** Cover crop treatment

| Cover crop treatment                  |
|---------------------------------------|
| Control (no cover)                    |
| Cereal rye at 30 lb/ac                |
| Radish at 10 lb/ac                    |
| Rye/Hairy vetch mixture at 25/5 lb/ac |

## RESULTS AND DISCUSSION



Cover crop herbage mass production was well below average in 2020 due to below normal precipitation and extreme cold in February.



Radish completely froze out in two of four plots. As a result, rye and rye/vetch treatments produced significantly greater herbage mass than radish (Table2).



As the 2021 study was conducted under furrow irrigation, cover crops were shredded and turned under during bedding operations. Hence, there was little to no residue on the surface at planting.



Plant stands were not significantly affected by treatment (data not shown). Peanut yields were not significantly affected by treatment (Table 1).



Block one, which was at the top end of the field, had lower yields than other blocks, thus were omitted from statistical analysis. As results among treatments are like 2020, residue management between years were in stark contrast due to irrigation and tillage systems.






While yields were not statistically different, numerically lower yields due to incorporation of rye may raise concerns for nutrient immobilization. In addition, furrow irrigation is not conducive to conservation tillage approaches.







**Figure 1.** Peanut stand with and without rye cover crop

## RESULTS AND DISCUSSION continued.

-  In depth microbial analysis was not conducted under the furrow irrigation practice in 2021.
-  However, root samples were collected at critical growth stages throughout the year to explore peanut nodule microbiome. In 2020, data indicated varying nodules sizes and activities among treatment and between locations.
-  Preliminary microbiome sequencing analysis indicated that there were many diverse microbes as well as bacterial endophytes colonized in small nodules while larger nodules were colonized nearly 100% by *Bradyrhizobium* sp. These data are still undergoing complete analysis and future work will focus on genomic DNA of individual isolates. These data will provide a better understanding of native bacterial populations and subsequent effectiveness in nodulation compared to potential effectiveness of inoculation.

## CONCLUSION

-  In summary, cover crops had no significant impact on peanut populations or yields within a tilled, furrow irrigated system.
-  Radish has not performed well as a cover crop, due to potential to winter kill under adverse conditions.
-  In contrast to a conservation tillage system, little to no cover crop residue is retained on the surface under furrow systems.
-  Implementing cover crops resulted in like yields compared to no cover crop treatments, but the soil health benefit in a tilled system should not be expected to be as great as observed in strip-till or no-till systems under pivot irrigation due to continual soil destruction via tillage. Hence, economic and logistical concerns should be carefully weighed before cover crop implementation in furrow irrigated systems.

**Table 2.** Cover crop treatment

| Cover crop treatment                  | Cover crop herbage biomass (lb/ac) | Peanut yield (lb/ac) |
|---------------------------------------|------------------------------------|----------------------|
| Control (no cover)                    | -                                  | 3732                 |
| Cereal rye at 30 lb/ac                | 566a                               | 3376                 |
| Radish at 10 lb/ac                    | 124b                               | 3441                 |
| Rye/Hairy vetch mixture at 25/5 lb/ac | 635a                               | 3260                 |