

Wheat Cover Crop Effects On Physical Properties Of Piedmont Soil

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Cover Crops

- Cover crops are often promoted as beneficial to soil health, but in 2012, cover crops were reportedly used on less than 5% of farmland in the U.S.A.¹.
- Soil physical properties (bulk density, water content) can be improved by cover cropping, but these processes take time to occur and the rate of change may differ depending on the type of soil present.
- There are also concerns about decreases in soil water content and cash crop yields due to soil resources consumed by the cover crop.



Winter-wheat cover crop



Soil compaction after tillage



Ponding formed by tillage traffic

Cover Crop Management

The North Carolina Upper Piedmont tillage trial began in 1984 and continued as a corn and soybean rotation with **5 different tillage intensities**. In fall 2015 (31 yr. later), a **winter-wheat cover crop** was added to the trial in order to follow soil health guidelines. Our objective for this research is to assess changes in physical soil properties and crop yields after implementing a cover crop. We hope to better inform growers about managing cover crops in piedmont soil.



Increasing tillage intensity

Management Schedule

Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct

Measure cover crop biomass



Plant cover crop



Spring tillage



Terminate cover crop



Apply fertilizer



Plant cash crop



Measure soil physical properties



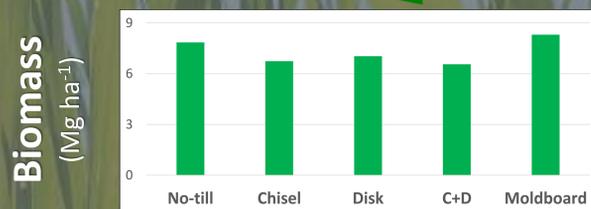
Harvest cash crop



Results

■ Bare soil ■ Cover cropped | Analyses were conducted using the Scheffe comparison at the 95% confidence level for all treatments.

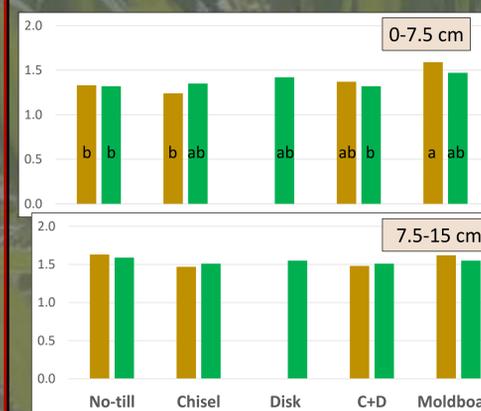
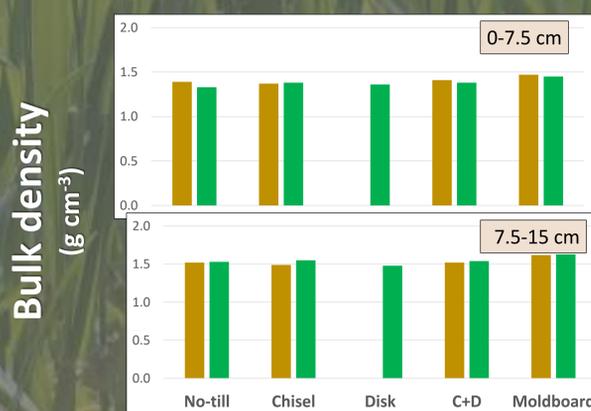
Year 1



Year 2

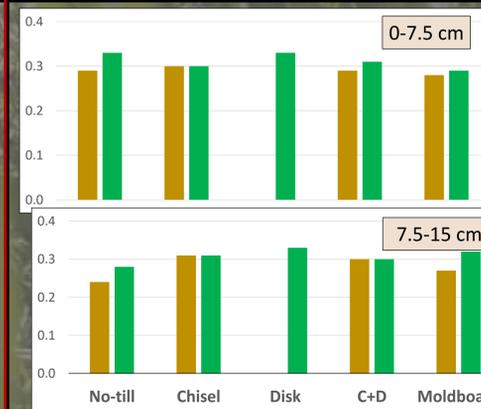
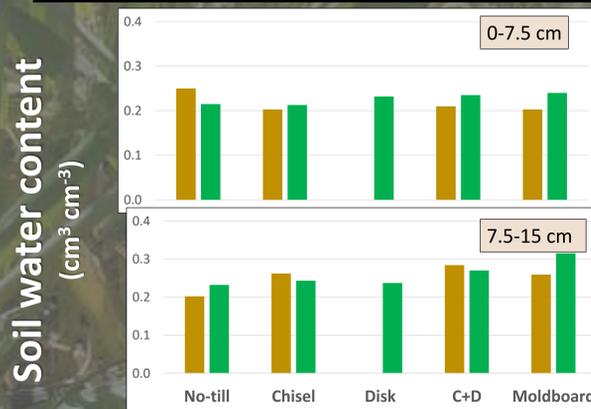


Cover crop biomass did not differ in either year. There was less biomass in year 2 because of late planting.

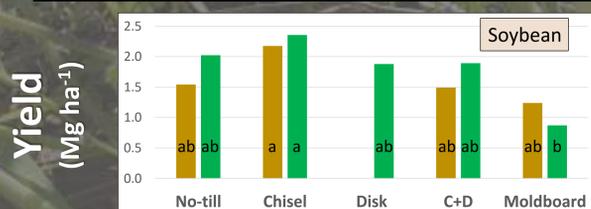


When comparing bare and cover-cropped soil with similar tillage, there were no statistical differences in surface (0-7.5 cm) or subsurface (7.5-15 cm) bulk density after 2 years.

However, surface bulk density in the second year was lower for no-till and chisel without cover compared to moldboard without cover.



Soil water content 1 week after the cash crop was planted did not differ among treatments at the surface or subsurface.



Corn yields for 2017 are pending...



Average soybean yields after the first year of cover cropping were not statistically different between bare and cover cropped soil with the same tillage.

Implications And Future Research

- Tillage was not limiting to the ability of the winter-wheat cover crop to accumulate biomass that may affect soil physical properties.
- Cover did not affect bulk density in the short term, but less intensive tillage typically had lower bulk density at planting.
- Soil water content near the time of cash crop planting was not reduced by the cover crop, but was also not different from bare soil.
- Crop yields in the first year after implementing the cover crop were not reduced.
- Additional soil physical properties (aggregate stability, penetration) will be measured to detect potential changes over time due to the cover crop.

References

1. USDA, 2012. Census of Agriculture

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