Soil Physical Properties of Two Indiana CSCAP Field Sites

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INTRODUCTION

Samples were collected to obtain baseline data (objective 1) and conditions continue to be monitored (objective 2) according to standardized protocols established by the regional team, in order to observe effects of the cropping systems. We expect baseline data to be similar across treatments. This poster presents year one baseline data for both SEPAC and DPAC field sites.

LOCATION & DESIGN

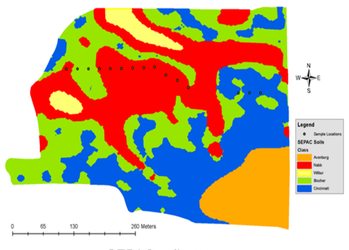
SEPAC, Butlerville, IN

- Cover Crop Project
  - CORN-soybean, with and without rye cover crop
  - SOYBEAN-corn, with and without rye cover crop
  - 4 treatments x 4 replicates = 16 plots

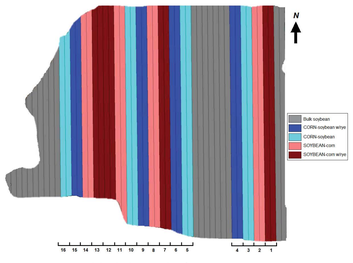
DPAC, Farmland, IN

- Drainage Water Management Project
  - 4 subplots (quadrants)
  - 2 quadrants DWM, 2 quadrants conventional drainage

Indiana sampling sites

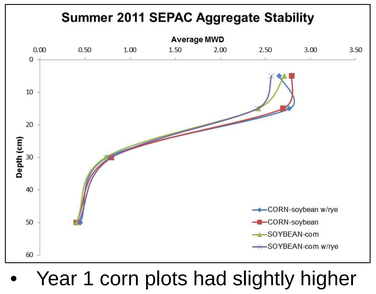


SEPAC soils map



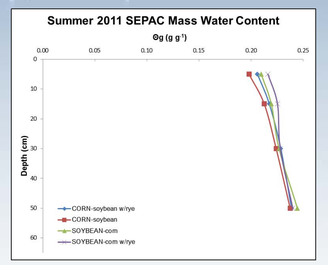
2012 SEPAC plot map

RESULTS & DISCUSSION

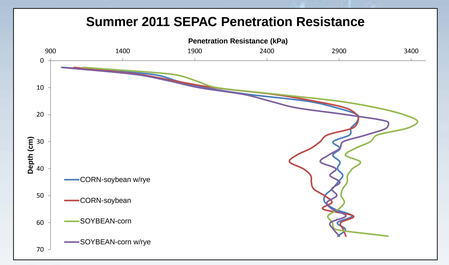


- Year 1 corn plots had slightly higher aggregate stability (Mean Weight Diameter, MWD) than Year 1 soybean plots in the 0-10 and 10-20 cm depths.

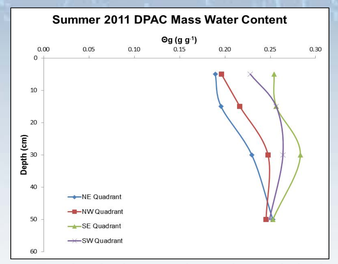
SEPAC cereal rye cover crop growth vs. weed growth in February 2012.



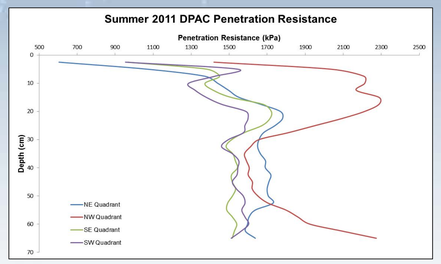
- Mass water content was very uniform across treatments and depths. Thus, penetration resistance was not affected by any differences in mass water content.



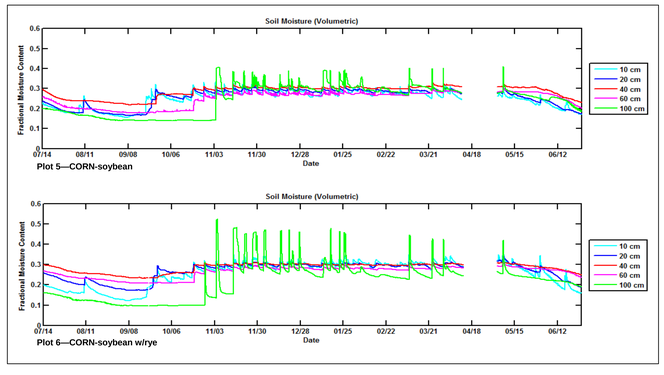
- Penetration resistance was fairly uniform across treatments in the first 20 cm, due to initial tillage being done across the entire field immediately prior to the beginning of this project.
- Year 1 soybean plots had higher penetration resistance beginning around 22.5 cm than Year 1 corn plots. This baseline condition will need to be taken into account when assessing differences in Year 5.



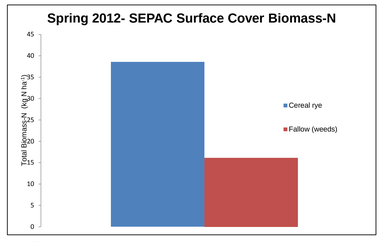
- For both the north and south halves of the field, the managed (NW, SE) and the free (NE, SW) drainage treatments were similar, with the managed being slightly wetter than the free drainage.



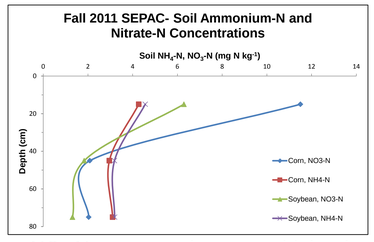
- Penetration resistance was fairly uniform across treatments, with the exception of the NW quadrant.
- The NW quadrant is the lowest part of the field, is a managed drainage treatment, and stays wetter than the other three quadrants. It is thus prone to greater compaction.



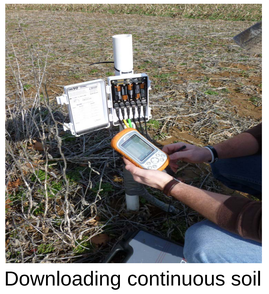
- The rye cover crop treatment (Plot 6 example) conserved more soil moisture than the no cover crop control (Plot 5 example) during the dry period of May-June 2012.
- Note the 20 cm moisture receded more slowly than at 10 cm depth for the rye (Plot 6), whereas both shallow depths receded quickly in the control (Plot 5).
- Greater soil moisture in a dry year is expected to increase crop yield and contribute to yield resiliency.
- Moisture at 40 and 60 cm depths receded more slowly in the rye than in the control treatments.
- Average soil water contents for June 2012 were higher for rye than for control.



- Plots with a cereal rye cover crop accumulated more biomass and total biomass-N compared to plots without a cover crop.
- Weeds had almost the same % N in tissue as cereal rye (data not shown).



- NO_3-N concentrations were higher in Year 1 corn plots compared with soybean plots, while NH_4-N concentrations were nearly identical in corn and soybean plots.



Downloading continuous soil moisture and temperature data to handheld field PC.

Bare area in SOYBEAN-corn with rye plot at SEPAC caused by vole damage.

ACKNOWLEDGEMENTS

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