

Evaluating differences in soil properties and management on a long-term watershed study in Kansas

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Objective

Determine the effect of cover crops and P management strategies on water stable aggregation (WSA) at a long-term experimental site.

Methods and Materials

- Kansas Agricultural Watershed (KAW) was established in 2014 near Manhattan, Kansas, as a no-till corn-soybean rotation.
- 2 × 3 factorial design with two cover crop treatments (with=CC and without=NC) and three phosphorus fertilizer treatments (none, spring injected P, and fall broadcast P).
- Water stable aggregate (WSA) samples were collected for the 0-5 and 5-10 cm depths in 2019. The method from Kemper, W. and Rosenau R. (1986) was used to evaluate the water stable aggregates.
- Total aggregation and mean weight diameter (MWD) data were statistically analyzed using analysis of variance with R software. Means were separated at $p < 0.05$.

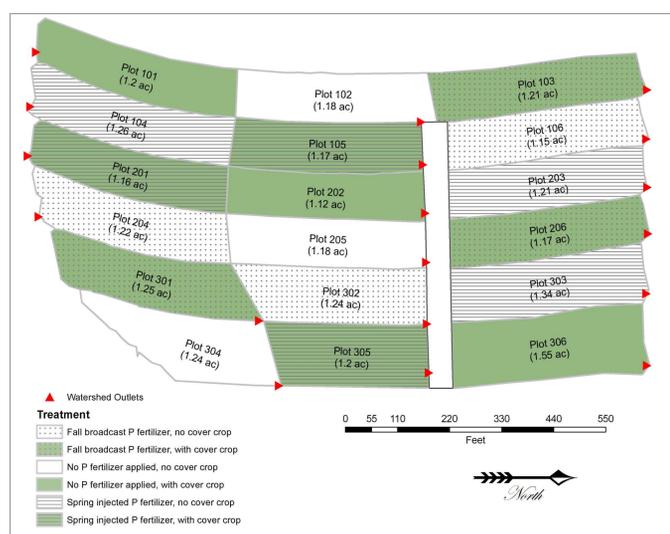


Figure 1 (left)

Map of KAW field laboratory, includes which plots have cover crops, and phosphorous treatment was used.

Results and Discussion

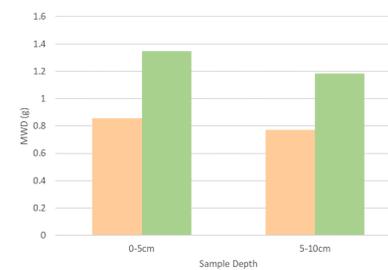


Fig. 2 (left): MWD was significantly affected by cover crops in the surface and subsurface depth; $p=0.038$ and $p=0.001$, respectively.

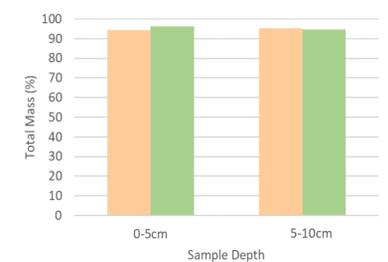


Fig. 3 (left): Total mass of WSA was not significantly affected by cover crops in both the surface and subsurface depth; $p=0.2406$, and $p=0.0920$, respectively.

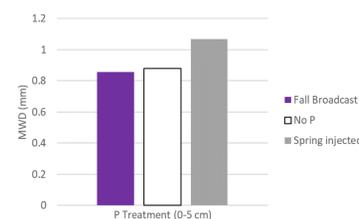


Figure 4 (left): MWD was significantly affected by P applications in the surface depth; $p=0.0200$.

Figure 5 (right): MWD was not significantly affected by P applications in the subsurface depth; $p=0.4485$.

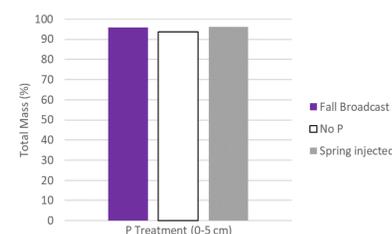
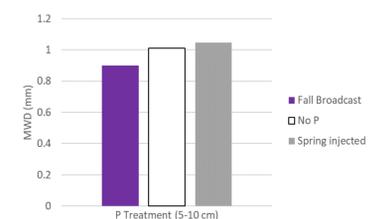
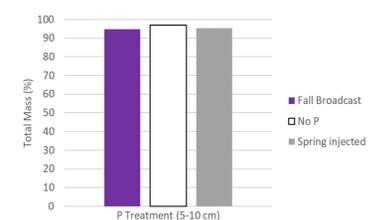


Figure 6 (left): Total mass of WSA was not significantly affected by P applications in the surface depth; $p=0.4590$.

Figure 7 (right): Total mass of WSA was not significantly affected by P applications the subsurface depth; $p=0.3723$.



Conclusions

- Cover crops had a significant impact on MWD at both 0-5 and 5-10 cm depths.
- P management treatments did not affect total WSA or MWD.

References

- Kemper, W. D., & Rosenau, R. C. (1986). Aggregate Stability and Size Distribution. In *Methods of soil analysis, part 1: Physical and mineralogical methods* (2nd ed., Vol. 9, pp. 425–442). essay, Soil Science Society of America
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Acknowledgements