Soil Hydraulic Properties Influenced by Stiff-Stemmed Grass Hedges. (S06-anderson092819-Poster)

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Abstract:

The effectiveness of stiff-stemmed grass hedge systems to control runoff and soil erosion depends on the water transport properties of the soil under grass hedge management. Grass hedge systems may alter soil physical properties which influence the infiltration rate and water runoff. The objective of this study was to characterize and compare soil hydraulic properties within a grass hedge system. The study was conducted on a site, which had been managed with switchgrass (Panicum virgatum) hedges for ten years at the USDA-ARS research station near Treynor, Iowa. The soil was classified as Monona silt loam (fine-silty, mixed, mesic Typic Hapludolls). Three positions were sampled: within the grass hedges, within the deposition zone 0.5 m upslope from the grass hedges, and within the row crop zone 5 m upslope from the hedges under soybean (Glycine max) production. Intact soil samples (76 mm x 76 mm) were taken from the three positions at four depths (100 mm increments) to determine saturated soil hydraulic conductivity, bulk density, and soil water retention. Infiltration rates were also measured using a single ring method, 250 mm diam. with 150 mm inserted into the soil. The grass hedges had significantly greater ($p>0.01$) saturated hydraulic conductivity values and significantly lower bulk density ($p>0.01$) for the first and second depths than the row crop and deposition zones. The saturated water content was significantly lower for the deposition zone than under grass hedge and row crop management. Water infiltration for the grass hedges was found to be nearly six times higher than for the row crop zone and 20 times greater than for the deposition zone. These results indicate that less runoff would be expected under grass hedges.

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