Using Polyacrylamide with Sprinkler Irrigation to Improve Infiltration. (S06-bjorneberg130004-Oral)

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Abstract:

Center pivot irrigation systems often apply water at rates greater than the soil infiltration rate. Applying high molecular weight, water-soluble, anionic polyacrylamide (PAM) to the soil can improve infiltration and reduce soil erosion. The objective of this study was to determine if single and multiple PAM applications with sprinkler irrigation improve infiltration under field conditions. A two-year study conducted near Kimberly, Idaho, USA used a solid-set sprinkler system and a one-year study conducted in Monte dos Alhos near Alvalade do Sado, Portugal used a center pivot. At Kimberly, applying PAM with four irrigations (total applied PAM was 2.1 kg/ha in 2000 and 3.0 kg/ha in 2001) significantly reduced total measured runoff from 5.9 mm (2000) and 9.2 mm (2001) for the control to 2.0 and 2.1 mm. Total measured soil erosion was also reduced from 52 and 34 kg/ha for the control to 21 and 5 kg/ha for the multiple PAM treatment. Applying similar or greater amounts of PAM with a single irrigation reduced erosion compared to the control, but not runoff. In the Monte dos Alhos study, runoff was reduced by applying a total of 2 kg/ha PAM with a single irrigation (43 mm) or three irrigations (65 mm) compared to the control (111 mm). Measured soil erosion was minimal (<1.2 kg/ha) and not significantly different among treatments. Applying PAM with multiple irrigations extends its effectiveness, but, applying a low rate may not adequately stabilize the soil surface during the first irrigation.

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