



Use of anionic polyacrylamide to control runoff, soil erosion, and nutrient loss

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Agricultural activities often act to degrade soil properties such as aggregate stability, infiltration rate, and water-holding capacity, due to mechanical disturbance, loss of organic matter, and lack of protective surface cover. Over the past fifteen years, considerable research has been conducted on the use of soil amendments to stabilize or enhance the soil surface that is subjected to rainfall and runoff. Anionic polyacrylamide (PAM) has been shown to be one of the most effective materials at helping to enhance infiltration, reduce runoff, reduce soil loss, and in some cases reduce nutrient losses from soils. This presentation will describe and summarize results from several laboratory and field experimental studies conducted at the USDA-ARS National Soil Erosion Research Laboratory using PAM. Under both natural and simulated rainfall, the polymer has been shown to reduce soil loss by 60-99% compared to untreated controls. A more recent experiment examined the use of PAM in land-applied livestock lagoon effluent as a means to reduce sediment and nutrient losses. In this laboratory study using soil boxes under simulated rainfall, 10 ppm PAM dissolved in the applied livestock lagoon effluent reduced total Phosphorus (P) and ortho-P losses by 22-72% compared to the untreated control. Field trials with PAM in the past several years have been examining its effectiveness at controlling erosion in newly-established grass waterway channel prior to vegetation establishment. The use of anionic polyacrylamide can be extremely effective at protecting a soil from runoff and soil loss on critical areas (steep slopes) during critical periods (vegetation establishment on disturbed soils).