Sprinkler Droplet Energy Effects on Soil Penetration Resistance and Aggregate Stability. (S06-lehrsch153947-Poster)

Authors:

- G.A.Lehrsch* USDA-ARS, Kimberly, ID.
- D.C.Kincaid USDA-ARS, Kimberly, ID.

Abstract:

Soil crusts inhibit seedling emergence and increase runoff. Modifying sprinkler irrigation systems to reduce droplet energy may reduce soil surface sealing and crusting, thereby increasing emergence. From 1997 to 2001, we evaluated the effects of sprinkler droplet kinetic energies of 0, 8, and 17 J/kg on penetration resistance (PR, a measure of crust strength) and aggregate stability (a measure of a soil's resistance to breakdown) at the soil surface (0-5 mm) after one and after multiple irrigations of an initially tilled, structurally weak Portneuf silt loam (Durinodic Xeric Haplocalcid) near Kimberly, ID. We applied 15 mm of water to field plots 2-4 times each year using a lateralmove sprinkler system with spray heads having smooth or rotating, fourgroove deflector plates. When measured after one irrigation, surface PR increased and aggregate stability generally decreased as droplet energy increased, though the magnitude of the response differed from year to year. When measured after multiple irrigations, PR decreased linearly with increasing droplet energy, likely due to erosion of the crusted surface. Producers should reduce sprinkler droplet kinetic energy to less than 11 J/kg to prevent crusting of recently tilled soil.

Corresponding Author Information:

Gary Lehrsch	phone: (208) 423-6508
USDA-ARS	fax: (208) 423-6555
3793 N. 3600 E.	e-mail: Lehrsch@nwisrl.ars.usda.gov
Kimberly, ID 83341-5076	

Presentation Information:

Presentation Date: Tuesday, November 12, 2002 Presentation Time: 2:00-4:00 pm Poster Board Number: 1831

Keywords: Soil Structure, Crusting, Physical Properties, Sprinkler Irrigation