SOME BIOHYDROLOGIC IMPACTS OF LAND IMPRINTING

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ABSTRACT

The land imprinter is a unique new tillage implement that molds aboveground plant materials and soil surface particles into mulch-lined, rainwater irrigated seedbeds and seedling cradles to increase the probability of crop stand establishment in arid and semiarid regions. This conservation tillage implement is designed to increase surface microroughness and macroporosity to, in turn, beneficially control infiltration, runoff, and erosion within plant-sized areas. Preliminary testing of an experimental rangeland imprinter sought to determine (1) several floral responses; (2) inprintability of land as a function of load-bearing capacity or penetration resistance; and (3) penetrability, infiltrability and erodibility of imprinted soil surfaces.

Results indicate that (1) biomass concentration at the soil surface, biomass production, and plant community diversity are all increased; (2) proving ring penetrometers can be used to determine the imprinter loading required for adequate penetration of imprint angles; and (3) interconnected downslope and cross-slope imprinted furrows form rainwater shedding and absorbing systems having the capacity to concentrate and conserve both rainwater and soil resources during intense rainstorms. Mean imprinted/unimprinted ratios for biomass productivity, floral diversity, infiltrability and erodibility were 30, 10, 2.1 and 0.2, respectively. Penetrability ratios for the imprinted furrow ridge and trough were 0.6 and 4.3, respectively.