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Experimental Testing of a Synthetic Mulch to Reduce Runoff and Evaporative Water Losses

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Abstract : The most severe limitation for plant production in arid areas is water. Rainfall events are rare but can have pulses of high intensity. As a result, crusts are formed, which decreases infiltration into the soil, and results additionally in erosive losses of soil. Direct evaporation of water from the wetted soil can account for large fractions of the water stored in the soil. Different kinds of mulches have been used to decrease the loss of water in arid and semi-arid region. This study aims to evaluate the effect of polystyrene styrofoam pellets mulch on soil infiltration, runoff, and evaporation as a more efficient and economically viable mulch alternative. Polystyrene styrofoam pellets of two sizes (0.5 and 1 cm diameter) will be placed on top of the soil in two mulch layer depths (1 and 2 cm), in addition to the non-mulched treatment. The rainfall simulator will be used as an artificial source of rain. The preliminary results in the prototype experiment indicate that polystyrene styrofoam pellets decreased runoff, increased soil-water infiltration. We are still testing the effect of these pellets on decreasing the soil-water evaporation.

Keywords : synthetic mulch, runoff, evaporation, infiltration
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