

SSC 107 - LABORATORY EXERCISE 9

Infiltration into Field Soils

Introduction

Infiltration occurs when rain or irrigation water moves into the soil profile across the soil-air interface. Knowledge of infiltration rates is especially important when one is concerned with irrigation management, erosion control, and regional hydrologic modeling and transport prediction. In field soils, the infiltration rate varies both in time and space because soil texture, soil-water content, degree of surface compaction, soil crusting, and other soil properties change with time and space. Generally many infiltration measurements are required to adequately characterize rates in field soils. This exercise will employ one of the several available methods for measuring infiltration in the field.

Procedure

1. Select a site with level soil surface. Remove rocks and woody plant material that may get caught under the infiltrometer edge.
2. Drive the infiltrometer uniformly and straight down with an infiltrometer driver.
3. Place the water reservoir on level ground near the infiltrometer (see attached figure). Make sure the garden hose is long enough.
4. Determine the surface area of the soil in the infiltrometer and the cross-sectional area of the water reservoir.
5. Attach and secure the constant head float-valve to the infiltrometer.
6. Connect the garden hose to the reservoir and the float and close all valves.
7. Fill the reservoir with water.
8. Place a plastic tarp in the infiltrometer so that it covers both the soil surface and sides of the infiltrometer. Fill the tarp with water.
9. Start infiltration into the soil by pulling out the plastic tarp quickly and carefully.
10. Periodically measure the time (over 1 minute initially) and water level in the reservoir for 2 hours or until amount of water entering the soil per unit time becomes constant.
11. Calculate the infiltration rate (V/At) as a function of time where V is change in volume of water in the reservoir in time t and A is the cross-section area of the infiltrometer. Plot the infiltration rate as function of time. Also plot the cumulative infiltration (V/A) as a function of time.

[Figure 1]

Lab Report Point Distribution

Abstract: 0.5

Materials and Methods: 0.5

Results: 2.5

Discussion: 5

Conclusion: 0.5

Overall Composition: 1

Total: 10