



Centurion  
UNIVERSITY

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SCHOOL OF  
AGRICULTURE

ASAC 1101 (2-1-0)

# FUNDAMENTALS OF SOIL SCIENCE

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PRACTICAL MANUAL



*Shaping Lives... Empowering Communities...*

MSSSoA

|                |  |
|----------------|--|
| <b>EX No.6</b> | <b>DETERMINATION OF INFILTRATION RATE<br/>BY DOUBLE RING INFILTROMETER</b> |
| <b>Date:</b>   |  |

The downward entry of water into the soil through the soil surface is called *infiltration*. It partitions rain into soil water and runoff.

Infiltration characteristics of soil are of practical significance in irrigation, soil and water conservation and watershed management.

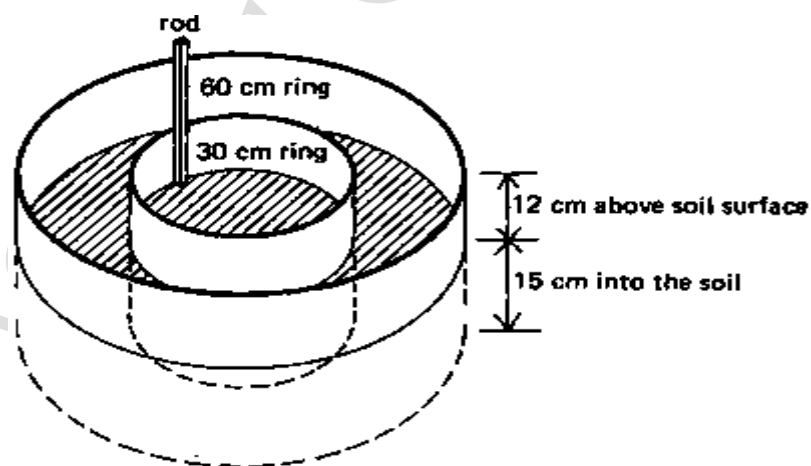
**Aim:** To measure the water intake rate of the soil using double ring infiltrometer.

**Principle:**

It measures amount of water entering soil profile as a function of time. Two concentric iron rings are used to avoid error due to lateral movement of water. Water level in both the rings should be kept nearly equal. The rate of fall of water level in the inner ring is measured.

**Apparatus required:**

Double ring infiltrometer – two concentric rings – outer ring 60 cm and inner ring 30 cm diameter, both 30cm height; driving plate/hammer; stop watch; scale/ hook gauge.



Double ring infiltrometer

**Procedure:**

- Describe the texture, surface condition, structure, compaction, salt content and layering sequence in soil profile.
- Determine initial moisture content.

- Install infiltrometer rings in a uniform and nearly level plot to a depth of 15cm.
- Pond 10-15 cm of water in outer as well as inner ring.
- Record the fall of water level in the inner ring with scale/hook gauge at 1minute and 5minutes (constant time intervals) till the water intake is constant.
- Using scale or hook gauge record the water level and time just before and after reponding.

**Observations and Calculation:**

| S.No. | Cumulative time (t) | Time interval (Δt) | Height of water (h) (mm) | Difference in water level (Δh) | Infiltration rate (IR) (mm/min) |
|-------|---------------------|--------------------|--------------------------|--------------------------------|---------------------------------|
|       |                     |                    |                          |                                |                                 |
|       |                     |                    |                          |                                |                                 |

$$\text{Infiltration rate (IR)} = \frac{\text{Volume of water entering}}{\text{Area of cross section} \times \text{Time}} = \frac{\pi r^2 \Delta h}{\pi r^2 \Delta t} = \frac{\Delta h}{\Delta t}$$

**Ratings:**

| IR (mm/hr) | Class            |
|------------|------------------|
| <1         | Very slow        |
| 1-5        | Slow             |
| 5-20       | Moderately slow  |
| 20-60      | Moderate         |
| 60-120     | Moderately rapid |
| 120-250    | Rapid            |
| >250       | Very rapid       |

**Result:**

Infiltration rate is .....mm/hr

**Inference:**

Soil comes under the category.....