

PART I PLANT - SOIL - WATER RELATIONS

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Reading Assignment:

1957 Yearbook of Agriculture, pp. 49-60 and 61-66.

Optional Reading:

1955 Yearbook of Agriculture
Irrigated Soils - Thorne and Peterson
Soil Physics - Baver
Soil Physical Conditions and Plant Growth - Russell

- A. Introduction.
- B. Basic Concepts.
 - 1. Available and unavailable water.
 - 2. Saturation, field capacity and wilting range.
 - 3. Dry, wet, tension, osmotic pressure, stress.
- C. Soil - Water Relations.
 - 1. Movement of water in soils.
 - 2. Retention and losses of water from soils.
 - 3. "Critical" soil moisture constants.
 - 4. Methods of expressing and determining moisture retention.
- D. Plant - Soil - Water Relations.
 - 1. Water requirements of plants.
 - 2. Absorption of water by plants.
 - 3. Available moisture range and "optimum" moisture levels.
 - 4. Effect of transpiration, evaporation, temperature and humidity on moisture relations.
 - 5. Effect of structure, texture, water table depth, salinity, plant diseases and fertility on moisture relations.

E. Watering Plants.

1. How much to apply.
2. When to apply.
3. How to apply.

PART II ACID, SALINE AND ALKALI SOILS

Reading Assignment:

1955 Yearbook of Agriculture, pp. 321-327
1957 Yearbook of Agriculture, pp. 67-71, pp. 282-289

Optional Reading:

Irrigated Soils - Thorne and Peterson
Chemistry of the Soil - Bear
Alkali Soils - Kelly
U.S.D.A. Handbook 60 - U.S. Salinity Lab.
Soil Conditions and Plant Growth - Russell

A. Introduction.

B. Acid Soils.

1. Origin.
2. Effect of acidity.
 - a. On fungi and bacteria.
 - b. On soils.
 - c. On plant nutrient availability.
3. Management and correction of acid soils.

C. Saline Soils.

1. Origin and definition.
2. Effect of salts on soils.
 - a. physical effects.
 - b. chemical effects.

3. Effect of salts on plant growth.
 - a. toxic effects.
 - b. osmotic effects.
 - c. symptoms and salt tolerance.
 4. Management of saline soils.
 - a. leaching requirement.
 - b. planting practices.
 5. Reclamation of saline soils.
- D. Alkali Soils.
1. Origin and definition.
 2. Diagnosis.
 3. Effect of alkali on soils.
 - a. Chemical.
 - b. Physical.
 4. Effect of alkali on plant growth.
 - a. toxic effects.
 - b. symptoms.
 - c. alkali tolerance.
 5. Management of alkali soils.
 6. Reclamation of alkali soils.
 - a. Magnitude of problem.
 - b. Use of amendments.
 - c. "Art" of reclamation.
- E. Discussion.