



Sixth Edition

SOILS

AN INTRODUCTION TO SOILS
AND PLANT GROWTH

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10:4 SALTY SOILS AND PLANT GROWTH

Although toxicity due to high concentrations of sodium, chloride, or other ions can occur, salts usually affect plant growth because of the **osmotic effect**. High salt concentration increases the potential forces that hold water in the soil and makes it more difficult for plant roots to extract the water. During a drying period, salt in soil solutions may become concentrated enough to kill plants by “pulling” water from them (**exosmosis**).

Salt in the soil solution forces a plant to exert more energy to absorb water and to exclude the excess ions of salt from metabolically active sites. The saltier a soil is, the wetter it must be kept to “dilute” the salt if it is to cause the least salt hinderance to the growing plant. Damage to plants by salty spots in fields is illustrated in Fig. 10-5.

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12:5.1 Fertilizers as Soluble Salts

Soluble salts are all soluble ions. Thus, most soluble fertilizers are soluble salts. Because of strong adsorption or precipitation of some ions (phosphates, calcium) and absorption or loss of others (nitrate), some materials cause greater short-time and long-time effects than others. Phosphates are usually low salt; chlorides, sulfates and nitrates are high in their immediate salt effects. Use of chlorides, sulfates, and nitrates of ammonium and potassium should be managed as if soluble salts were being added—they are. High-analysis fertilizers add more nutrients at the same level of salt addition.