Soluble Salts (electrical conductivity)

The term soluble salts refers to the inorganic soil constituents (ions) that are dissolved in the soil water. Pure water is a very poor conductor of electric current, whereas water containing dissolved salts conducts current approximately in proportion to the amount of salt present. Thus, the measurement of the electrical conductivity of a soil extract gives an indication of the total concentration of salts. The electrical conductivity measurement is reported in millimhos per centimeter (mmhos/cm). Crops differ in their sensitivity to soluble salts. High soluble salts can restrict root growth, cause burning of the foliage, and limit crop yields. The relative values for soluble salt sensitivity levels are described in Table 4.

Most soils in Minnesota are nonsaline (0 to 2 mmhos/cm); however, a few soils in western Minnesota have formed under high sodium/alkaline conditions and may be high in soluble salts. Other conditions where soluble salts may limit plant growth are when fertilizers are overapplied or placed too close to the roots.

The relative salt tolerance of various fruit and vegetable crops is presented in Table 5.

Organic and Inorganic Fertilizers

Plant roots absorb the majority of their nutrients from the soil solution in the ionic (inorganic charged) form. Larger molecules can also be absorbed by roots, but their rate of absorption is slow. Thus, if a fertilizer (organic or inorganic) is applied, it must first be broken down to its simplest forms to be used efficiently by plants.

According to the Minnesota Department of Agriculture, a natural organic fertilizer has to be derived from either plant or animal materials containing one or more elements (other than carbon, oxygen, and hydrogen) that are essential for plant growth. Organic food production, however, allows for a broader definition that includes naturally occurring inorganic substances such as elemental sulfur and gypsum, and naturally occurring mineral materials that are not chemically modified.