

Spray Water Quality

Water Chemistry:

Six major ions make up the dissolved material in water. The major cations in water are generally calcium, magnesium and sodium. The major anions are sulfate, chloride and bicarbonate. Other ions that can be presented in lesser amounts are potassium, iron and nitrate.

Salt Level:

The total concentration of salt in water is measured by the electrical conductivity (E.C.) of the water. The units of our E.C. measurement is millimhos per centimeter (mmhos/cm). Another term for this unit of measure is decisiemens. Another term for the total concentration of salt in water is total dissolved solids (TDS). The TDS level of water is generally reported in parts per million (ppm). A quick way to estimate the TDS level of a water sample is to multiply the E.C. by 640. A typical range of E.C. in well water in the upper Midwest is 1.00 to 2.50 mmhos/cm. High quality irrigation water has an E.C. less than 0.25 mmhos/cm. Water with an E.C. over 2.00 mmhos/cm is not recommended for irrigation in the upper Midwest

Hardness:

Water hardness is caused by calcium and magnesium. AGVISE reports hardness in milligram per liter equivalent to calcium carbonate (mg /l CaCO₃). Another unit often used in the water softener industry to measure hardness is grains per gallon. To convert an AGVISE hardness reading to grains, divide the AGVISE reading by 17.1. For household use, ideal hardness is less than 100 mg/l CaCO₃ or about 6 grains.

SAR:

The Sodium Adsorption Ratio (SAR) of a water sample is the proportion of sodium relative to calcium and magnesium. The SAR has no units associated with it. Water with a SAR value over 6 should not be used for continuous irrigation on most soils.

Nitrate-Nitrogen

Nitrate-nitrogen levels exceeding 10 ppm of NO₃-N are a health concern for humans. High nitrate levels are also a concern for livestock that may drink the water. To check a water sample for drinking purposes, a certified laboratory must test other parameters such as coliform bacteria.

pH:

pH is a measure of the hydrogen ion concentration in water. The pH of water indicates whether the water is acid or alkaline. High pH can affect the solubility of Assert herbicide. If the pH of the water and Assert solution is too high, the chemical will form sludge in the bottom of a tank.

AMS Requirement:

The ammonium sulfate (AMS) requirement is the amount of AMS needed to overcome antagonistic ions in the water. High salt levels (E.C.) in spray water can reduce weed control in nearly all situations. Applying sulfate (AMS) ions to the solution reduces the antagonism caused by the calcium, magnesium, sodium, potassium, and iron cations. Some herbicides need AMS or 28% (UAN) to enhance control of certain weeds even in water without salts. This is especially true for glyphosate, sulfonyleurea (SU) herbicides, Ultra Blazer and Basagran. **Never use less AMS or 28% than the label calls for.** For more information on spray water quality, the 2003 North Dakota Weed Control Guide has an excellent section on spray water quality on page 72.