The Industry Side

Fertilizer Practices For Highly Alkaline Water

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Water that has alkalinity in the range of 300 to 500 is considered HIGH to VERY HIGHLY alkaline. To maintain optimum pH and to obtain good crop performance it will require special adaptations in fertilizer, nutrients, and possibly some water treatment.

Very HIGH alkalinity usually arises from excessive carbonate and bicarbonate levels of calcium, magnesium and sometimes sodium. If the levels of sodium are high, providing a sodium absorption ratio (SAR) of greater than 2, then these practices will not apply and other specialized practices are advised. Usually crops do well when water contains 60-180 ppm alkalinity. The following general recommendations are provided for use with BACCTO Grower Products. The exact application of fertilizer will vary with operation. Since BACCTO Grower Products have been formulated to provide maximum stability and are much more consistent and uniform in pH and nutrient balance than most products, applying these recommendations to other blends may not be appropriate.

With most crops, very HIGH water alkalinity can be tolerated for 3 to 4 weeks without specialized treatment. In plugs, 1 to 2 weeks can greatly influence the condition of those plugs since the substrate volume is small. Always remember that the substrate acts much like a filter (trapping nearly everything that is in the water) and then selectively releasing some of the minerals through leaching.

With HIGHLY alkaline water, acidic fertilizers are needed to counteract the alkalinity and the resulting increases in pH. Common acidic fertilizers like 20-10-20, 21-5-20 and 20-20-20 are suggested. Very acidic fertilizer like 12-45-17 or 9-45-15 provide soluble phosphates which serves to acidify the water. Constant supplies of excess phosphate (above 200 ppm) should be avoided.

Each fertilizer is different! Every soluble fertilizer sold for greenhouse purposes has listed on the label a potential acidity or basicity. This number indicates the amount of limestone each ton of fertilizer will counteract. Highly acidic fertilizer can have a strong impact on lowering pH. However, some fertilizers have no acidity but instead have a basicity and provide a total liming effect. These basic fertilizers should be avoided except in specialized conditions.

Commonly, 100 to 200 parts per million of a 12-45-10 will neutralize between 29 and 580 parts per million of the alkalinity, thus providing more stability to the pH while providing nutrients.

Fertilizer Effects on Alkalinity:
Most fertilizers have a certain amount of POTENTIAL ACIDITY OR POTENTIAL BASICITY. It is listed as pounds per ton of fertilizer. To calculate the effect of the fertilizer do the following:

1.
Take the POTENTIAL ACIDITY and divide that by 2000.

2.
Multiply by 100 and divide by the percentage of nitrogen.

3.
Then multiply by the PPM concentration of fertilizer in the irrigation water.

Short way:

$$\frac{\text{Potential Acidity}}{20} \times \frac{\text{PPM(N)}}{\text{Fert. N Percentage}} = \text{Alkalinity Neutralized}$$

This yields the theoretical ppm alkalinity neutralized by the fertilizer. This number can be subtracted for the total alkalinity to get the resulting alkalinity.

Any remaining unwanted alkalinity can be compensated for by starting with a lower media pH (decrease starting pH by about 0.5 units for each 100 ppm alkalinity remaining to be neutralized) or injecting acid.

In each operation the results will vary depending upon; the amount of water put through the substrate, frequency of watering, rate of crop growth, growing media characteristics, and other miscellaneous factors. Therefore, it is essential that pH and soluble salt levels (conductivity) be monitored regularly. We recommend that all growers perform weekly measurements of pH and soluble salts to provide an accurate and up-to-date measurement of what is happening in the nutritional environment of the crop.

For additional information on management of nutrition, contact our business office: 1-800-324-PEAT and present your questions to Jean McKinley to forward to the appropriate support personnel.