DON'T FREAK OUT! IT'S ONLY pH

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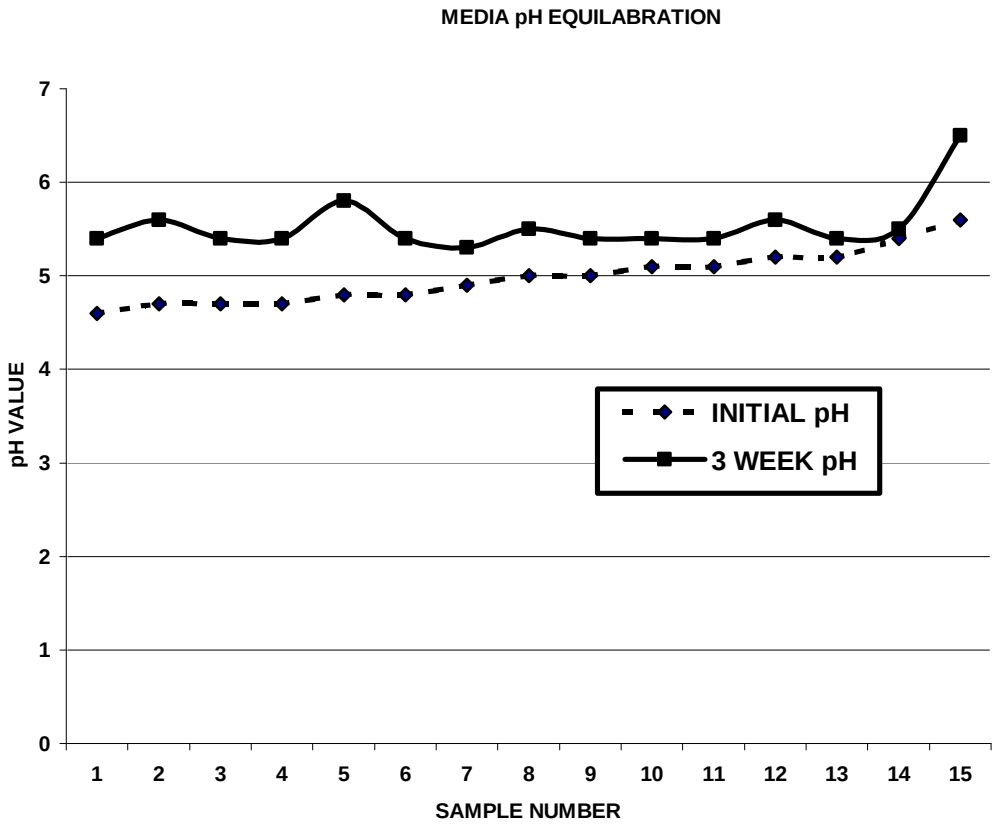
All too often growers become overly concerned about the pH of their soil or water. With greater understanding of pH control, one can manipulate and control pH within reasonable ranges for plant material.

pH management of soil and water is straight forward if you understand some basic principles and ignore "old wives tales". In our discussion regarding pH, we are always referring to the methodology, which employs a saturated paste testing method with the testing probe placed directly into the slurry.

Initial soil mix pH: If you are preparing your own soil mix or ordering it from the soil mix manufacturer, you must realize that the pH of the freshly prepared mix is going to change over the course of two to three weeks. In our own laboratory, we have documented that in most cases, a full three weeks is required for the pH to become fully equilibrated with soil acidity. After three weeks, the measured pH will remain more or less stable. The chart below shows the range of pH changes over a three week time period in unused media for 15 separate samples.



You will note that in the above chart that the pH may change by as much as 1 (one) full pH point over the course of three weeks.

It is the final three-week equilibrated pH, which should be used to make management decisions regarding adjustments of lime or dolomite in the starting mix. Also the balance between calcium and magnesium should be assessed so that when lime and dolomite are adjusted, you maintain proper balances of these two competitive essential elements. In general, the three week saturated pH should fall between 4.0 and 5.0 on the pH scale for acid loving plants, but around 5.8-6.2 on the pH scale for other types of non-acid loving plants in artificial soil-less media.

Irrigation water pH: As with the soil pH measurement, you should wait until your water has become equilibrated with the atmosphere. This may take up to one hour. For example, a water sample obtained from the tap and immediately measured for pH may register 7.0 on the pH scale, but after one hour, measure 7.5 on the pH scale. It is the dissolving of carbon dioxide from the atmosphere into the water, which forms dilute bicarbonate or alkalinity and thus results in a higher pH after one-hour equilibration in irrigation water (or the downline solution fertilized water). If you are attempting to obtain a specific downline solution pH, base your decision upon the one-hour equilibrated pH, not the initial pH right out of the tap or hose. Mineral acid, such as phosphoric acid and sulfuric acid, are commonly used to partially neutralize the bicarbonate ion and thus reduce alkalinity and water/solution pH. When adding acid to water, remember that some buffering is desirable. This means that you should leave some bicarbonate in the water and not totally neutralize it. Otherwise, you will find that the water pH will vary in pH significantly from one end of the range to the other, depending upon the types of fertilizers that you may be using in your water and the amount of acids employed. The general rule of thumb is to leave about 0.5-1 milliequivalent per liter bicarbonate (or about 30-60 parts per million bicarbonate. This will provide some buffering capacity to the water and will prevent wide swings in water/solution pH.

Fertilizer use and soil/water pH management: In waters which contain sufficient bicarbonate to impact soil pH (usually over 1.5 milliequivalents per liter bicarbonate), the use of mineral acids or acidifying soluble fertilizers may help prevent soil pH increase. Acidic fertilizers, such as 20-10-20, ammonium sulfate or ammonium nitrate may be all that you need to use in your liquid feed program to offset the soil pH increase, if bicarbonate is sufficiently high in your water. An accurate testing of your irrigation water will help to determine whether or not mineral acid is actually needed above and beyond the acidification provided by the fertilizers you use.

pH change and soil fertility: The pH will vary widely depending upon the fertility status of your soil. Typically, under high fertility conditions, there will be a depressing effect on pH (more acid). Under low fertility conditions, you will see an increase in the soil pH. You may not necessarily be concerned about this depending upon what you are growing and how the plants are responding, however.

Summary: Remember that pH will vary within a range. It is difficult, if not impossible to maintain soil pH at a specific pH point. Because of the ability of plants to tolerate a range of pH conditions, you should not be too specific about a particular pH point, but try to maintain the pH within a given range.