

PROSCAPE

By Michael Hurdzan, Ph.D., golf course designer and consultant

Q: What is buffer pH?

A: Buffer pH is a measure of the slowly changing chemical properties of soil particles, not the soil solution. Soil pH is usually measured by mixing a

small amount of air dry soil with an equal amount of water and using a calibrated electrode probe to measure the hydrogen concentration of the soil. Since this measurement is of the soil water, it may vary greatly depending upon any soil amendment that had been added. For instance, if the soil was recently limed, one would expect the pH to be higher than that of the soil particle.

Since the soil solution pH is so variable, many soil test labs include a measure of buffer pH, which is a measure of the acidity or alkalinity of the soil particles and not the soil solution.

However, remember that it is the soil solution that most influences nutrient uptake and hence plant growth. Manage the soil water and you manage the plant growth.

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Q: What causes chlorosis?

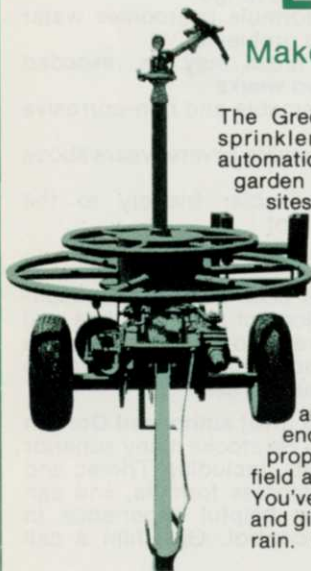
A: As most are aware, chlorosis is a term applied to abnormal yellow color of plant parts caused by poor chlorophyll production. The yellowish symptom is most often caused by a nutrient deficiency, but it also can be caused by insect or disease injury, improper air-water conditions in the root zone, or other chemical or physical injury.

From a nutrient standpoint, the chlorophyll molecule is complex and many elements are needed to construct it. Carbon, hydrogen, nitrogen, oxygen, and magnesium make up chlorophyll and a shortage of any of these elements, especially nitrogen and magnesium, restricts its production. In addition, many intermediate steps in chlorophyll production depend upon adequate amounts of iron, sulfur, manganese, copper, zinc, and other elements. However, most often lacking are nitrogen and iron since they are relatively mobile and easily lost.

Reoccurrence of chlorosis can be minimized by frequent application of elemental nitrogen and iron, or a less frequent application of slow-release nitrogen and chelated iron. Chelated iron is iron combined with an organic carrier which breaks down slowly in the soil. A sensible fertilization program including micronutrients should prevent chlorosis.

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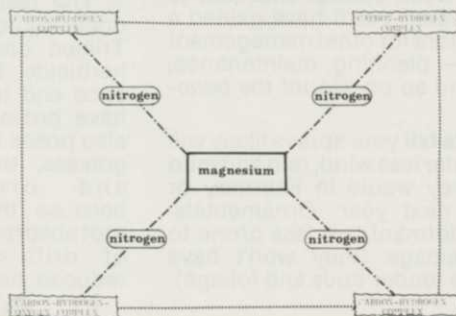
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Chlorophyll Molecule



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