Controlling soil pH allows plant to maintain consistent growth rate

By TOM LUBIN

The need to have control of the pH of the soil is very important to the quality of all plant material. If the pH of irrigation water is controlled, less total fertilizer may be required to produce the same growth rate and disease may be minimized.

The main methods for pH controlling the past were associated with the application of large quantities of sulfur or nitrogen fertilizers in a form that would oxidize, producing hydrogen ions in the process. The hydrogen ions produced in these processes can lower the pH of the soils, but it is impossible to precisely control the quantity of these materials to maintain the desired pH.

Even if proper quantities of these materials were added, a change in the weather may cause the oxidation process to speed up or become too slow for proper pH control. If the pH were adjusted to the desired value, irrigation with the high pH water could raise the pH again. The two more reliable methods of soil pH controls actually alter the soil pH by changing the pH of the irrigation water. Either type of system, if carefully maintained and monitored, can give reliable pH control. These systems can provide a safe, long-term answer for high pH soils and the control of salt buildup in soils.

The first type of system uses fertigation, injection of an acidic solution directly into the pressurized irrigation line to provide pH control of the water and ultimately the soil. More than 275 of these systems have been in use throughout the world over the last seven years. The most reliable, injectable, acidic, water treatment solution is a compound formed from the reaction of urea and sulfuric acid, monocarbamide dihydrogensulfate [MCDS $((nh_2\text{-}co\text{-}nh_3)+(hso_4)\text{-})$; trade name: pHairway].

This is what can happen to turf when high pH conditions are not controlled.

Several types of systems have been specifically designed for the direct safe injection (fertigation) of this acidic material which has no DOT restrictions and is not "listed" as an EPA hazardous waste. These systems have been designed to inject the material proportionally to the water flow rate and/or have a pH controller which can monitor and maintain the desired pH in the water.

Along with the acidification of the water from the sulfuric acid portion of the compound, the urea portion of the compound can give the advantage of additional acidification as the nitrogen is added. A good record should be kept of the total quantity of fertilizers applied including the nitrogen applied with this pH adjustment. As the soil pH is decreased, the plants may respond more efficiently to all applied fertilizers.

The water pH treatment additive required on any facility is always applied in a conservative program. As with any material that is applied through a fertigation system, the rate of injection is easily increased or decreased, as required, to obtain the desired results. Since the nitrogen is added in small and steady applications, the nitrogen applied in your fertilizers program may be reduced.This material is acidic and is being injected under pressure, therefore all fittings should be checked on a periodic basis.

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The second type pH system utilizes sulfuric acid for pH control. More than 150 sulfuric acid pH control systems have been installed and used safely. Most of these systems have been installed in the southwestern U.S. and other arid and semi-arid areas around the world, but interestingly the first sulfuric acid system was installed on a golf course in Ohio.

These sulfuric acid systems require that the acidification process be accomplished before the water enters the pump station. The acid is metered into the wet well, proportional to water flow, and with good mixing. A double pH control override monitors the pH of the water in the wet well and the water in the irrigation line that will stop the metering pump if the pH becomes lower than the desired value. The pH of the water may be easily maintained at the desired pH+/-0.1 units, but it should be noted that sulfuric acid must never be injected under pressure into a closed line. Heat is generated when the acid is diluted with water.

The sulfuric acid pH control system treats high pH irrigation water without nitrogen being added. This may be important if reclaimed water with high nitrogen concentration is used for irrigation. A person may apply fertilizers for their nutrient value alone.

In conclusion, many water pH control systems have been installed in areas where the water has a pH as high as 11.0 and ECw values well above 3.0 This water may be made usable for irrigation when the pH is properly controlled.

The result of proper use of either urea-sulfuric acid or sulfuric acid pH control systems can allow the pH of the soil to be maintained at or near the range of 6.5 to 7.2. When the soil is maintained in this range, the plant expends less energy to control its own active transport system.

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OBITUARY

James G. Harrison, 95

Architect James G. Harrison, whose career began with Donald Ross at Pinehurst in 1921 and spanned 60 years, died July 21, in Monroeville, Pa. Mr. Harrison, who lived in nearby Wilkins, was 95.

Mr. Harrison was one of the few to serve two terms as president of the American Society of Golf Course Architects (ASGCA), having led the organization in 1955 and 1969. In later years he was a Fellow of the society, which includes the leading golf course architects in North America.

After having worked alongside Ross for six years and briefly with Orrin Smith, Mr. Harrison opened his own practice in the late 1920s. Between 1955 and 1964, he was joined in his practice by son-in-law Ferdinand Garbin.

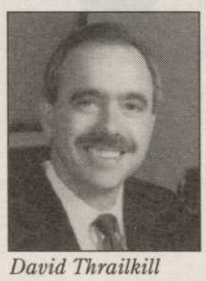
During his career, Mr. Harrison designed more than 70 courses, including Warwick Hill Country Club in Flint, Mich., site of the PGA Tour's Buick Open. Other Harrison-designed courses include Sewickley Heights Country club in Sewickley, Pa.; Lakeview Country Club in Morgantown, W.Va.; and Penn State University's White Course. Mr. Harrison also renovated the Blue Course at PSU.

Mr. Harrison was born in Wilkins Township, Pa., and left the bulk of his architectural legacy, 45 designs, in his native state.

Who needs third-party pump certification? You do

By DAVID THRAILKILL

Since 1971, OSHA has required that pump systems be third-party certified. The pump station as a complete unit must meet all applicable national standards, and must be suitable for its intended purpose. In a typical pump station destined for an irrigation application, certification includes confirmation that a tank is fabricated to ASME standards; a welded steel header and components are manufactured to ANSI standards; AND water pumps are manufactured to Hydraulic Institute standards. OSHA 1929 CFR1910.303/399 contains the federal standards and definitions relating to pumping station certification. System specifiers must require pump stations bear the label of a Nationally Recognized Testing Laboratory (NRTL).



David Thrailkill

It wasn't until 1988 that OSHA established a program (OSHA 1929 CFR1910.7) to accredit a network of independent NRTLs that were truly independent of standards setting authorities, manufacturers, fabricators, or designers operating under those standards.

An NRTL performs standards conformity assessments and implements the disciplinary phases of compliance engineering. They assure that a system meets all relevant standards for a given application. Certification encompasses three levels, from basic component recognition (level 1, i.e. wires, fuses, etc.), to product listing (level 2, electric motors containing basic components) to full system certification (level 3, complete unit composed of level 1 and level 2 components).

There are approximately 10 NRTLs operating in the United States. At least as many laboratories are applying for NRTL accreditation, which OSHA accredits and recognizes for a 5-year period.

Among the largest, UL and FM operated initially as both standard-setting authorities and testing laboratories, contrary to the initial OSHA mandate. Their NRTL re-accreditation status remains under review because they were not independent as specified in OSHA certification requirements. ETL Testing Laboratories, the largest testing service in the world, has been accredited since OSHA first established RTL accreditation in 1988. With the signing of SyncroFlo in 1992, ETL became the first to provided full inspection, testing and evaluating services to pump system vendors in the irrigation industry.*

The cost of third-party certification for a manufactured system is very little if all components used in a system are already up to standards of good engineering practices, are suitable for the intended purpose, and meet all OSHA and EPA standards for safety. This is especially true if the manufacturer has established rigid quality assurance procedures, routinely provides the highest quality equipment, and supports the system with full documentation.

NRTL certification of a pump station can be done in a manufacturing environment or on a golf course after installation. Obviously, buying a pumping system from a certified manufacturer is easier and less costly than obtaining the necessary certification for a single unit on-site.

System owners are liable for injuries in installation, operation or maintenance.

There have been many court cases establishing the owner's ultimate responsibility. Apart from owner liability risks, installations that do not meet code are subject to a first offense fine up to $7,000 per unit, subsequent fines up to $70,000 per unit.

However, owners are able to shift much of the responsibility and liability if they can show that designers, installers, or manufacturers had easily available and economically viable alternatives, installers, or manufacturers had easily available and economically viable alternatives to third-party certification.

The bottom line benefit of systems certification is the raising of overall pump station safety and quality standards with negligible pass-along cost to the end user.

David Thrailkill is golf sales manager for Sycnroflo, Inc., a manufacturer of pump stations based in Norcross, Ga.