Micah Woods, Ph.D.
micah@asianturfgrass.com
Twitter: @asianturfgrass

(turfgrass talk)

Do you know how much salt is in the irrigation water?

The usual thing to think about with irrigation is the quantity of water applied and when to apply that water. Those are important, of course, but one also needs to know what is in the water. That is, to manage irrigation effectively, one needs to know both the water quantity and the water quality.

The most important thing to know about water quality is the amount of salt in the water. The salt is invisible. If there is a low amount of salt, the grass will be fine. If there is a higher amount of salt in the water, it will still be invisible to the eye when the water is applied, but that salt can accumulate in the soil and cause severe damage to the grass. If you know how much salt is in the water, the potential problem can be managed before any harm is done. But if the salt accumulates undetected, applied more and more with each irrigation cycle, without anything done to manage it, the grass can be damaged severely.

Before the season when the most irrigation water is applied, make sure a representative sample of the water is tested so you know how much salt is in it. The salt will be reported in one or both of two types of units. One unit is the electrical conductivity (EC) of the water, reported as decisiemens per meter (dS/m). A second unit is total dissolved solids (TDS), reported as parts per million. As more salt dissolves in water, the more current can be conducted. So a measure of the conductivity is an easy way to estimate how much salt is dissolved in the water. A standard conversion between the conductivity (EC) units and the TDS units is 1 dS/m = 640 parts per million (ppm). To measure the TDS, a liter of water can be evaporated, and the remaining salt, which doesn't evaporate, is measured. To get an estimate of TDS, measure the EC and multiply by 640.

What happens when salt is applied with irrigation water? Let's imagine a case where the TDS was 800 ppm. The EC in this case would be 1.25 dS/m. For every liter of water applied, there are 800 milligrams of salt. During the summer, the daily water use on the grass (the evapotranspiration, ET) may be about 5 millimeters.

I like to think of this in terms of one square meter. In one square meter, 5 liters of water is equivalent to a 5 millimeters depth of water. In one day, if water is supplied to replace ET, that would be 5 liters of water applied to 1 square meter. And each liter of our water has 800 milligrams of salt. In 5 liters, there would be 4,000 milligrams -- 4 grams -- of salt. That isn't much. A fertilizer application might be made at 20 or 30 or 40 grams of product per square meter. But what happens when irrigation is applied every day? Applying 5 liters of water gives 4 grams of salt/square meter/day, and over one week that makes 28 grams of salt. That much probably won't burn the grass. But what about the 56 grams of salt that have been supplied with the irrigation water over two weeks?

That much salt could do some damage to the grass, especially if the soil water content decreases. That will concentrate the salt, because the grass uses water, but the salt remains behind in the soil. The symptoms of salt damage to grass look like dry spot, or drought stress, or wilting. But when you check the soil, you will find that there is still water in the soil. The soil is wet, but the grass looks like it is dry. This is because high salt in the soil prevents the grass roots from obtaining enough water from the soil. It is like a chemically induced drought.

The solution to salt in the water is counterintuitive. Even though the water contains salt, the way to manage this is to add more water than ET -- to add more water than the grass uses. This causes some water to leach below the root zone, and the water that leaches carries some salt with it. More about that management in a future article. First, though, make sure you know how much salt is in the irrigation water.

Micah Woods, Ph.D., is chief scientist at the Asian Turfgrass Center (www.asianturfgrass.com) and an assistant adjunct professor in the department of plant sciences at the University of Tennessee.