

# How Do Wetting Agents Work?

By Tony Koski

**W**ithout water, none of us in this business would have a job. Most of us are constantly trying to develop more efficient ways to irrigate turf. We may reduce the amount of irrigated turf or install more efficient irrigation systems. Most of us pay close attention to soil moisture and plant stress and try to minimize the latter by applying the least amount of water. I would bet that *all* golf course superintendents use wetting agents somewhere on the golf course, if not everywhere on the course. Have you ever thought about how wetting agents can help you to irrigate more effectively?

Water is a truly unique compound. Individual water molecules have a strong attraction or each other, due to their dipolar nature. (Remember that from high school chemistry?) Water molecules, however, are also strongly attracted to other things in nature such as clay, silt and organic matter. This attraction allows soil to hold water for plant use. Water is not strongly attracted to individual sand grains but rather to the small pores between sand grains of appropriate size (hence the USGA greens mix).

The strong attraction that water molecules have for each other is especially apparent when water is sprayed on a hydrophobic (water-repellent) surface, such as a newly waxed car or a plant leaf. In both cases the waxy surface increases the attraction of water to itself (surface tension), causes the water to "bead up" and prevents it from spreading evenly over the surface. Unfortunately for turfgrass managers, similar hydrophobic conditions can develop in soils, preventing irrigation and precipitation water from moistening soil uniformly. This is why we get hydrophobic soils, thatch and isolated dry spots. In other situations we encounter stratified layers in rootzones as a result of changes in philosophy

regarding topdressing materials and/or frequency. Water has difficulty moving between adjacent layers of sand, thatch, soil, peat, sand again, thatch again, and so on. You get the picture.

The time-honored, field-proven method of dealing with these problems is the use of wetting agents. A wetting agent is simply a surfactant (or "surface-active agent"), a material that reduces the attraction of water molecules for each other. This action enables the water to spread more evenly on a hydrophobic surface, to move more quickly through small pores and more effectively across "boundaries," such as those layers in greens and tees.

As a point of caution, wetting agents should not be considered "miracle cures." They do not reduce compaction, nor do they affect plant water-use rates. They cannot replace basic cultural practices like proper topdressing frequency, core cultivation, thatch control, installation of proper drainage systems and intelligent irrigation management.

Some of the *proven* advantages of wetting-agent use include improved water movement in soil, especially in layered soils, and rewetting of hydrophobic rootzones (sands or thatch), which result in reduced turf wilting and improved turf growth and quality. Reduced formation of dew and frost is another valid and proven reason for using wetting agents. Though unproven by research, speculation suggests that wetting agents improve movement of pesticides (particularly insecticides) into the thatch layer and underlying soil.

Potential negative effects are generally seen only with misuse or misapplication. They include phytotoxicity when wetting agents are applied to stressed turf or are not properly watered in; root injury (rare); increased thatch accumulation (healthier turf will form more thatch); and deflocculation (dispersion) of soil particles, which is a

*potential* problem with long-term use of excessive rates.

### Brand Choice

Which brand is best? That's like asking which is the best beer or the best pickup truck. Brands that have large market shares wouldn't sell if they were not effective wetting agents. Typically, we use the wetting agent with which we have the most experience. They all work in the same manner, and all possess the potential to be misapplied. When trying a new wetting agent, follow the label until you are comfortable with the activity of the wetting agent because the chemistry of various brands can differ greatly. Some of the most effective wetting agents can cause quite severe phytotoxicity when misapplied, but that is the fault of the applicator and *not* the wetting agent. Treat wetting agents as you would any other chemical tool, and you will avoid trouble.

Residual activity will also vary with the brand that is used, application rates, soil types, amount of thatch, temperature, irrigation regimen and the type of problem that you are attempting to solve. Soil microbes will utilize wetting agents as a food source. These materials can be leached through rootzones, especially on sandy soils.

When isolated dry spots or a layered soil is the problem, core cultivation in conjunction with wetting-agent use is always more effective than wetting agents alone. Regular use of wetting agents in these situations is important because they are not eliminating the condition, only temporarily modifying it. Regular use of wetting agents enhances water infiltration and drainage and results in more efficient water use, fewer overly wet/dry spots and better-quality turf. □

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