Assessing the Usefulness of Physical Water Conditioning Products to Improve Turfgrass Quality and Reduce Irrigation Water Use

Bernd Leinauer, Ty Barrick, and Cody Robertson
New Mexico State University

Objectives:
1. To assess the effect of three water conditioning systems on perennial ryegrass establishment, overall turfgrass performance, and root distribution under potable and saline irrigation.
2. To study the impact of water conditioning units on salinity build-up in the rootzone.

Start Date: 2005
Project Duration: two years
Total Funding: $6,000

Physical water conditioning units such as AquaPhyd, Carefree, Fre-Flo, Magnawet, and Zeta Core have been used in the golf course industry because of manufacturers' claims that they improve turf quality and reduce scaling, compaction, the effect of salts on soil physical and chemical characteristics and plant growth, and reduce the amount of irrigation water necessary for adequate turfgrass growth and quality. These products are gaining popularity, particularly in the Southwest, despite the lack of scientific evidence to support the manufacturers' claims.

A study conducted at New Mexico State University in spring and summer of 2008 investigated the effect of physical conditioning systems on turf color, quality, and cover, and chemical rootzone composition of a perennial ryegrass stand irrigated with either saline or potable water. The soil at the site is a Torriorthent, a sandy entisol typical of arid regions.

Treatments consisted of 2 levels of irrigation water quality and 5 conditioning products. During 2008, irrigation was

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applied daily with either potable water (TDS 397 ppm, SAR 1.55, pH 8) at approximately 90% ET_o or saline water (TDS 3,110 ppm, SAR 8.94, pH 7.5) at approximately 125% ET_o. Conditioning treatments included two catalytic water conditioners (Zetacore and FreFlo), a magnetic water conditioner (Magnawet), a hydro-electrical conditioner (Aqua-PhyD), and a control treatment.

The area was established in 2007 with 'IG2' perennial ryegrass. Data collection included turfgrass color and cover (measured by digital image analysis), visual assessment of turfgrass quality, salinity build-up in the rootzone, and turfgrass stress as measured by Normalized Difference Vegetation Index (NDVI).

The water conditioning units had no effect on turfgrass quality and only saline water reduced quality significantly. When plot coverage and turf color data were averaged for water qualities, Magnawet and Zetacore plots had lower coverage and lighter green color than control plots or plots irrigated with Fre Flo-treated water at the end of the growing

period (November 2008). Aqua-PhyD plots did not differ from control plots for coverage or color.

There was an obvious and expected difference in soil salinity between plots irrigated with potable water and those irrigated with saline water. All the treatments that received saline water showed higher levels of salts compared to treatments receiving potable water. However, water conditioning had no effect on the chemical composition of the rootzone.

Summary Points

● Studies were conducted at New Mexico State University to assess physical water conditioning products under potable and saline irrigation.

● Products tested had no effect on the quality of a perennial ryegrass stand.

● At the end of the 2008 growing period, Zetacore- and Magnawet- treated plots had lower coverage and lighter green color than control plots.

● Physical water conditioning had no effect on the chemical composition of either saline or potable irrigated rootzones.

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