

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

Research was conducted at New Mexico State University's golf course to investigate the effect of physical water conditioners on turfgrass performance and rootzone salinity. The research area measured approximately 75 m by 20 m (60' by 240') and was established with 'IG2' perennial ryegrass. The soil at the site is a Torripsamment, a sandy entisol typical of arid regions. Treatments consisted of two levels of irrigation water quality and four conditioning products. Irrigation was applied with either potable water (0.6 dS cm^{-1}) or saline water (2.5 dS cm^{-1}).

Conditioning treatments included



Treatments consisted of two levels of irrigation water quality and four conditioning products.

a magnetic conditioner (trade name Magnawet), a non-grounded catalytic conditioner (trade name Fre Flo), a grounded catalytic conditioner (trade name Zeta Core), and a control treatment. Each treatment was replicated three times. Plot size was 6m x 6m (20ft by 20 ft). Data collection included turfgrass establishment (measured by digital image analysis), turfgrass quality measurements, root mass, and salinity build-up in the rootzone.

The water conditioning units had no effect on the establishment of perennial ryegrass and only saline water delayed establishment significantly. After establishment, none of the water conditioners tested had an effect on turfgrass quality or root mass. Turf quality was lower on most of the saline plots compared to plots irrigated with potable water.

There was an obvious and expected difference in soil salinity between plots irrigated with potable water and plots irrigated with saline water. All the treatments that received saline water showed higher levels of salts compared to treatments receiving potable water. Differences between conditioning treatments were inconclusive. While Fre Flo and Magnawet reduced sodium adsorption ratios and soluble salt concentration in saline treated plots at depths of 10 to 30 cm. Neither treatment had a significant impact on electrical conductivity. Zeta Core treated plots recorded lowest or second lowest



Research was conducted at New Mexico State University's golf course to investigate the effect of physical water conditioners on turfgrass performance and rootzone salinity.

EC values but second highest SAR and soluble salt concentrations in saline treated plots.

No clear trend among measured parameters for any given conditioner could be established. Additionally, all salinity parameters measured, even on the plots treated with saline water, were well below threshold levels considered critical for cool-season turfgrass growth. Further research is needed to evaluate the long-term impact of these conditioning units on quality and rootzone salinity. It remains to be determined if water conditioning improves rootzone chemistry when initial salinity levels are high enough to reduce turfgrass quality.

Summary Points

- Studies are underway at New Mexico State University to assess physical water conditioning products under potable and saline irrigation.
- Products tested had no effect on the establishment and the quality of a perennial ryegrass stand.
- Under saline irrigation, differences in rootzone parameters between the conditioning treatments and the non-treated control were inconclusive.
- Further research is needed to evaluate the long-term impact of these conditioning units on quality and rootzone salinity.