Scanning the Journals

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Golf Courses Influence Water Quality

As the popularity of golf continues to grow and participation continues a slow steady climb, the need for new golf courses and demands on existing courses will increase. While many scientific studies have established the environmental benefits of golf courses as wildlife habitats and areas where water quality can be improved, few large scale monitoring studies have verified the water quality claims.

Researchers at the Center for Marine Science at the University of North Carolina—Wilmington, monitored 5 golf courses for nutrients and fecal coliform to determine discharge and how certain land use controls on golf courses such as buffer zones, wet detention ponds, and woodland wetland areas influence discharge. The fecal coliform was suspected based on the amount of wildlife that a course could sustain.

There were significant differences among the golf courses for nutrient discharge. For example, one course that had a designed drainage stream monitored, had high levels of nitrates in the middle of the course, but a final wet detention pond reduced the discharge from the site. Whereas, another course that had low nitrate levels in a stream on the course, had higher nitrate levels in the absence of a wet detention area prior to leaving the site. None of the courses had elevated fecal coliform levels, in fact most of the courses significantly reduced the levels that entered the site prior to discharge.

This study highlights the fact that much still needs to be learned at the landscape scale relative to golf courses and water quality. Several course had elevated levels of nitrate in the water on the course, that was not discharged. Why is this happening? Clearly, land use controls to exploit the biofiltering capacity of the landscape can be installed or retrofitted into golf course design.

From: Mallin, M.A. and T.L. Wheeler. 2000. Nutrient and fecal coliform discharge from coastal North Carolina golf courses. J. Env. Qual. 29:979-986.

Herbicide Increases Microbial Activity?

Concern over the use of pesticides in turf is often based on human exposure, influence on water and wildlife, and the influence on soil microbes. Conventional wisdom, as well as some scientific studies have found that herbicides significantly reduce microbial activity. Still, there are many questions regarding the measurement of microbial activity as well as the fact that many pesticides are carbon based molecules that require microbial degradation.

A study was conducted at Texas A & M University with glyphosate (Round-Up) applied to a silty loam soil at 1, 2, 3, and 5 times the recommended rate to investigate the influence on soil microbial activity and biomass. Interestingly, as glyphosate rate increased, the mineralization of carbon (C) and nitrogen (N) (a measure of microbial activity) increased and was significantly greater than the untreated plots for 56 days. Additional data indicated that the increased activity was directly related to addition of glyphosate. However, soil microbial biomass was not affected. Therefore, it appears that an insufficient amount of N and C was added to increase the number of microbes, however enough was available to increase activity.

As the genetically modified turfgrasses are introduced into the industry that are resistant to glyphosate, understanding the influence of this material on microbial activity is one of the many hurdles this technology will have to cross on its way to implementation. It appears that microbial activity is not a significant concern relative to glyphosate.

From: Hanney, R.L., S.A. Senseman, F.M. Hons, and D.A. Zuberer. 2000. Effect of glyphosate on soil microbial activity and biomass. Weed Science, 48:89-93.