TechLink Research Summary #3321

Nutrient Runoff: A Comparison of Filtrexx® Slope Protection vs Hydroseed Applications

Summarized From: Faucette, L. Britt, Carl F. Jordan, L. Mark Risse, Miguel L. Cabrera, David C. Coleman, and Larry T. West. 2006. Vegetation and soil quality effects from hydroseed and compost blankets used for erosion control in construction activities. Journal of Soil and Water Conservation. 61:6:355-362.

Nutrient Runoff

The objective of this study was to evaluate the water quality impact from Filtrexx® Slope protection and hydroseed applications to soils disturbed by construction activities. The soil was classified as an eroded Pacolet Sandy Clay Loam. The testing area was cleared of vegetation and uniformly graded to a 10% slope with a grading blade mounted skid steer, exposing a semi-compacted (from the skid steer) subsoil (Bt horizon) to simulate construction site conditions on 48 m2 test plots. Each treatment, excluding the control, was seeded during treatment application with a 1:1 mix of hulled and unhulled Common Bermuda (Cynodon dactylon) grass seed as specified for erosion control by the Georgia Department of Transportation. Three simulated storm events were conducted over 1 yr. A Norton Rainfall Simulator with 4 variable speed V-jet oscillating nozzles was used to simulate rain events within an intensity of 7.75 cm (3.1 in) h-1 for 1 hr duration - equivalent to a 50-year return.

Because hydroseed is applied with inorganic N and soluble P it is more likely that these nutrients will be lost to storm runoff and consequently are in forms more available to aquatic plants which leads algae growth, eutrophication, and impaired water quality.

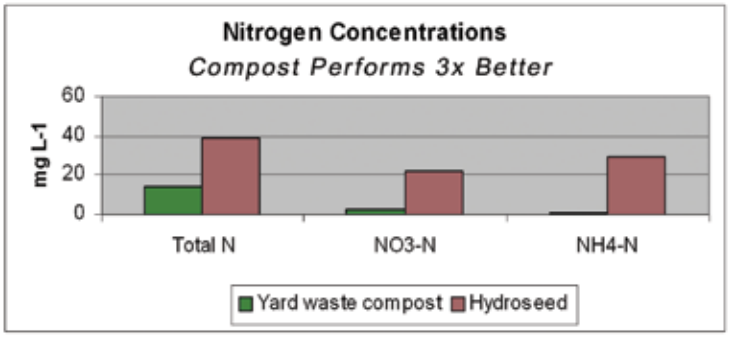
Nitrate-N loading to water bodies can also be toxic to aquatic and terrestrial animals, including humans. Mass loading of total P and dissolved P from hydroseed was significantly greater than Filtrexx® Slope protection. The potential for high losses of P from hydroseeding applications needs to be addressed by the policy and regulatory community, particularly since it is one of the most ubiquitous erosion control/vegetation establishment best management practices (BMPs) in the United States. Erosion control materials high in nutrients, particularly nutrients in soluble and inorganic forms, increase the risk of nutrients entering water bodies; although, because compost can significantly reduce runoff and nutrients are in organic form, nutrient loads are often lower from these BMPs relative to stabilization and vegetation establishment practices. This may be of particular concern where erosion control/ vegetation establishment is needed near surface waters, storm inlets, storm channels/ditches, wetlands, or TMDL listed watershed/water bodies.

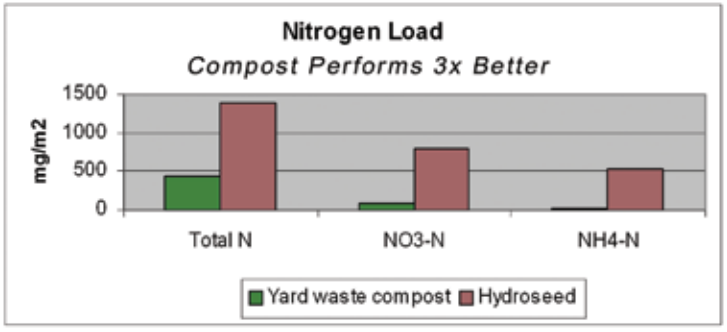
Nitrogen Concentrations and Loads

Total nitrogen runoff concentration of the compost blanket was approximately 1/3 that of hydroseed.

Nitrate-N concentration in the compost blanket runoff was less than 1/8 that of hydroseed.
[Note: the US EPA limit for drinking water is 10 mg/L.]

Total N load (concentration x runoff volume) from the compost blanket was approximately 1/3 that of hydroseed; nitrate-N load from the compost blanket was approximately 1/9 that of hydroseed and ammonium-N load from the compost blanket was approximately 1/20 that of hydroseed.

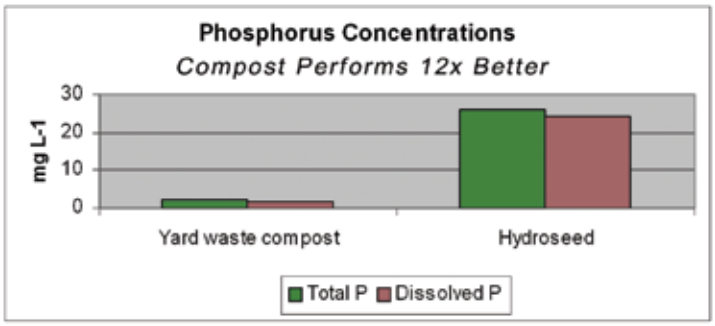


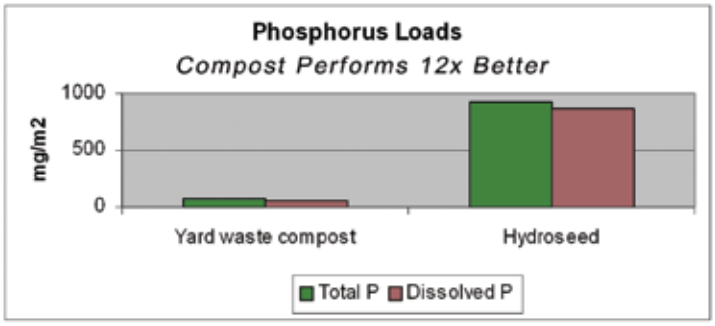


Phosphorus Concentrations and Loads

Total phosphorus runoff concentration of the compost blanket was less than 1/12 that of hydroseed for both total and dissolved phosphorus.

Phosphorus loads (concentration x runoff volume) in the runoff from the compost blanket plots were less than 1/12 that of hydroseed for both total and dissolved phosphorus. Phosphorus loading is a major source of eutrophication and one of the leading causes of water quality impairment.





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