

HYBRID TREATMENT SWALES



A technology to address water quality issues
Research Factsheet COHA7-B



What is a Hybrid Treatment Swale?

A combination of a woodchip bioreactor plus other media components to treat water quality is termed a Hybrid Treatment System or Swale (HTS). If the system is deep and flow between cells is pumped, it is referred to as a system, but recent research has shown that a passive shallow swale with woodchips and other media in sections (or cells) can also be effective at removing selected nutrients. The swale installations are useful at edge of a field or where container nursery leachate/runoff is routed to a collection pond so that any residual fertilizer in the water can be removed before it reaches the pond.

When is a HTS useful?

Runoff from fertilizer applications contains nutrients including nitrogen and phosphorus. These elements are known to contribute to eutrophication of ponds. The woodchips are very effective at removing nitrate (N), and in some cases can remove phosphorus as well. Where water-soluble or slow-release fertilizers are used, phosphorus levels reaching ponds can easily result in algal or cyanobacterial blooms. In this case, slag (high in iron, with lots of P binding sites) can be used in one of the sections. Polishing the water afterwards can be valuable, as both biological oxygen demand and pH of the water rise after going through the woodchips and slag.



A passive woodchip bioreactor swale.



A hybrid treatment swale at a container nursery.



Three 'cells': woodchips, slag, and gravel.

What are the drawbacks?

A hybrid treatment swale isn't magic - it can't remove all nutrients (e.g., potassium or salts), and it does take a significant area to have a large enough system to ensure sufficient contact time between the runoff and the media. Volume calculations must be done to determine the correct sizing, and selecting media cell components is based on the water quality and particular contaminants that it's designed to remove.

This factsheet was developed as part of the Accelerating Green Plant Innovation for Environmental and Economic Benefit Cluster and is funded by the Canadian Ornamental Horticulture Alliance (COHA-ACHO) and by the Government of Canada under the Canadian Agricultural Partnership's AgriScience Program.

For more information, contact jwest@phytoserv.com.

