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THE COMPLETE WATER MAGAZINE



New Solutions For Old Problems!





Restore - Reveg - Reclaim





Biotic Earth Hydraulic Growth Medium

Revitalize and Vegetate Poor Soils Without Importing Topsoil



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Common Problems with Standard Vegetation Establishment Methods

- Poor vegetation establishment increases risk of erosion:
- Failure to establish sufficient vegetation can cause delays in closing permits and increased costs to fix.
- Lack of vegetation can draw a lot of attention from property owners.
- Unwanted vegetation due to imported soil
- Weed competition.



Construction Goals

- Always attempt to limit the amount of earthwork to the minimum necessary.
- Reduce the risk of erosion as much as possible.
- Limiting the amount of disturbed earth.
- Reduce costs.





What Happens to Soil During Construction?



- Organic matter, the soil's food bank, is lost due to stripping and stockpiling.
- Macro and micro pores, crucial for air and water exchange, are lost due to compaction
- Microbes essential for nutrient cycling are normally destroyed during the stockpiling period.



The Traditional Approach

- Reclaim or import topsoil onto the site, and fertilization of the soil if needed.
- Use of RECPs or Hydraulic Mulches, often designed to last longer when vegetation establishment is not occurring fast enough. Many times we are adding synthetic fibers to mulches or blankets to extend the longevity of the products.

Conventional

 Sit up"fixes" surface and focus more on immediate surface protection from detachment.









The Biotic Earth Approach

Amend the existing soil with the right organic matter, fertilizer, and tillage of the soil if needed to improve the physical conditions. By doing this, vegetation can be established without the need for importing TOPSOIL



Conventional Approach to Vegetation Establishment Starts by Adding Topsoil

• Ontario Provincial Standard Specifications for Topsoil, 2007

"Topsoil shall be a fertile loam material that is free of roots, vegetation, or other debris of a size and quantity that prevents proper placement of the topsoil. The topsoil shall not contain material greater than 25 mm in size, such as stones and clods".

"Imported topsoil shall not have contaminants that adversely affect plant growth".



What is Topsoil?



O) Organic matter: Litter layer of plant residues in relatively undecomposed form. A) Surface soil: Layer of mineral soil

B) Subsoil: This layer accumulates iron, clay, aluminum



Why do we Import Topsoil?



Topsoil is imported primarily to add **ORGANIC MATTER**



- Are we testing imported soil?
 - Topsoil may be compromised by stockpiling.
- Potential for weeds and other contaminants.



The Ontario Provincial Standard Specifies a minimum of 5 cm (2") of topsoil. To achieve this it requires the transport of 25 trucks per hectare loaded with 20 m³ (26yd³) of soil.





Essential Elements for Plant Life





Which Elements can be Managed on a Construction Site?

- Surface Air is not a problem. Subsurface Air can be increased through tillage and creation of pore space.
- Heat and Light are provided by the Sun.
- Water is provided through rain. It is not practical to water most sites.
- <u>Food</u> is the most controllable element.



Nutrient Cycle in Vegetation





Sources of Organic Matter

- Sphagnum Peat Moss is a readily available, consistent, weed free source of Organic Matter.
- Bio-solids are sometimes used but can present health concerns. It is primarily a fertilizer.
- Compost is another source but it breaks down quickly and is prone to inconsistency. Nutrient loading in compost may adversely affect plant growth.



Why Peat Moss?

HONEYCOMB STRUCTURE

This photomicrograph of a peat moss particle shows it's natural capillary and porous structure (natural sponge). It increases the water and nutrient retention as compared with any other source of organic matter (compost, manure, wood, etc. The peat absorbs water and nutrients and avoids the leaching and loss of nutrients to the environment.

This is why it is the most popular green house growing medium in the world.

Carbon:Nitrogen ratio

About the Carbon:Nitrogen ratio

The carbon-nitrogen ratio is a useful way to compare soil amendments. This ratio is an indicator of the stability of the soil supplement. Lower ratios mean the supplement is very stable and will not draw down nutrients from the soil that plants need to grow. In general, carbon-nitrogen ratios of 30 to 1 or lower are best.

amendments such as saw dust can

How to use the ratio

Saw dust has a very high ratio (400 to 1). As a result, saw dust makes water and nutrients unavailable (or less available) for the plants.

esult, (or plants.

The high C:N ratio of soil

By contrast, compost, with a 30 to 1 rating, is nearly ideal. A drawback, however, is that compost breaks down quickly in the soil.

Peat moss, at 50 to 1, is near compost on the carbon-nitrogen scale. It draws down nitrogen slightly, but not enough to hurt plants. Another advantage is that peat moss lasts for years in the soil.

Common Carbon:Nitrogen Ratios

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Prepared by Muhammad Marrush October 24, 2007

For more information visit: International Programs www.aes.ucdavis.edu/IntProg/Default.htm

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Role of Bacteria in the Food Cycle

- Nitrogen Fixing Bacteria will make atmospheric nitrogen available to plants.
- "Shredder" Bacteria will digest organic material, such as decaying roots and litter, down into usable NPK.
- Healthy bacterial colonies will make plants more disease resistant.

Role of Mycorrhizae in the Food Cycle

- A fungus that aids in the absorption of nutrients by forming a symbiotic relationship with plant roots.
- 90% of plants form a relationship with mycorrhizae.
- They dramatically increase the area of root systems.
- Reintroduction of mycorrhizae can dramatically improve plant performance with less water and fertilizer.

Biotic Benefits

Deeper Roots Taller Plants Greater Density

Components of the Biotic Earth System

Peat Moss in combination with Thermally Refined Straw, Flexible Flax Fibers and a stabilizing emulsion or tackifier creates a stable matrix which:

1. Temporarily protects exposed soil from erosion.

2. Mechanically fixes the peat in place.

3. Serves as an excellent growing medium to accelerate the grass growth.

EarthBound[®] Soil Stabilizer & Tackifier

Function of Earthbound Products

Chemically engineered combination of materials to provide:

- Moderate erosion control performance
- Soil flocculation
- Soil aggregate formation which leads to establishment of pore spaces
- Vegetation establishment

