Erosion Control and Establishing Roadside Vegetation Made Easier

With Compost!

Your Presenters Today
Charles Duprey, 5 year member of the US Composting Council Marketing Development Committee. NYSAR3 Member

&

Mary Schwarz, of the Cornell Waste Management Institute. NYSAR3 Member

What we are covering today –
- What is Compost?
- Why use Compost?
- Sources of Compost and Resources
  + Animal Mortality Composting
- Compost Uses
  + Compost Use in Erosion Control
  + Establishing Roadside Vegetation
- Questions?

What is Compost?
- Compost definition
- Compost is a soil amendment, not soil
- Compost comes from a process. “Compost” as a noun and a verb
- Compost is an industry
- Compost groups seek to expand composting and compost uses like USCC and NYSAR3

Compost - Definitions
“Compost” is the product from the controlled biologic decomposition of organic material that has been sanitized through the generation of heat and stabilized to a point that it is beneficial to plant growth.

Compost is produced through the activity of aerobic microorganisms. These microbes require oxygen, moisture, and food in order to grow and multiply. When these resources are maintained at optimal levels, the natural decomposition process is greatly accelerated.

From “Field Guide to Compost Use”, USCC 1996

Compost as a soil amendment

Soil (Structure for Growth)
Higher Density
More Structure
Mostly Inert Materials
Mix of Sand Silt Clay (Gravel)

Compost (Food for Growth)
Low Density
Incorporate into or on soil
Mostly Organic Materials
Should be friable, low inerts

70th Annual School for Highway Superintendents
All Compost!

Many shades of Brown and Textures

Compost is a soil amendment, not soil!

- Compost does best when used in conjunction with soil
- Soil is the basis for successful plant growth
- Low quality poor soils can be (and are routinely) amended with compost to make good plant environments

Compost as a Process

- It’s not enough to call it “Compost”, one should demonstrate the process.
- Composting requires, time, temperature readings and oxygen.
- The end product is called Compost, the processing is composting.
- Important for compost quality, to protect your soils, have success to know and recognize the difference.

Compost as an Industry

- Over 4900 compost operations in the United States
- Recycling in excess of 20 Million Tons of Materials Annually (only 40 states track closely)
- Projected continued growth, billions of dollars invested and growing
  http://www.ilsr.org/state-of-composting/

Groups and Organizations

- NYSAR3
  New York State Association for Reduction, Reuse and Recycling
  http://www.nysar3.org/
- Cornell Waste Management Institute
  http://cwmi.css.cornell.edu

All these groups support and seek to expand composting and compost use
**Why Use Compost!**

- Why Use Compost?
- Compost and Soil Cycle
- Benefits of Compost (3 Kinds)
- Examples of Successful Compost Use in New York State
- Compost Works!

**Why use Compost?**

- Reductions in soil quality
- Poor soil protection & management practices
- Increased soil erosion (NPDES Phase II)
- Storm water management requirements
- Protection of surface & ground water quality
- Climate change
- Pollutant management & remediation
- Improved plant growth / less loss
- Reduction of plant maintenance inputs
- Effective & economic

*Because it works!*

**Compost and Soil Cycle - What Happens to Soils and Soil Functions as We Turn Forests into Cities?**

*From Soils for Salmon*

**Benefits of Compost Use**

*Physical:*
- Improves soil structure
- Moisture management

*Chemical:*
- Modifies and stabilizes pH
- Increases cation exchange capacity
- Supplies nutrients

*Biological:*
- Supplies soil biota
- Suppresses plant diseases

*Other:*
- Binds/degrades contaminants
- Binds nutrient

COMPOST Improves Soils...

**Healthy Soils Improve…**

- Plant Growth and Survival Rates
- Plant Sustainability (Less Inputs)
- Water Quality
- Air Quality
Compost works in New York State

Successful Transportation projects
- NYS Thruway Exit 39-40 re-vegetation
- Highway 390 Rochester NY Swales
- Wetland Construction Broome County
- NYS DOT Soils Specifications for higher soil organic matter all over in different regions

Other project types
- athletic field construction
- golf course and top dressing
- green roofs
- home usage gardens lawn, soil manufacture

COMPOST WORKS

Sources of Compost and Resources

- Types of Compost Feedstocks
- Composting Processes
- Where to find compost
- Compost Resources
- Compost Testing and the Seal of Testing Assurance Program

Types of Compost Feedstock Sources
- Biosolids
- Animal manures
- Yard waste, wood & wood by-products,
- Pre & post consumer food waste
- Industrial by-products
- Various organic by-products

Sources of Compost and Resources

and or Animal Mortalities and making your own compost

Material Collected and Delivered to the Facility

Recyclable Materials

1. Feedstock Recovery

2. Feedstock Preparation

3. Composting

4. Odor Treatment

5. Compost Screening and Refining

6. Compost Curing

7. Compost Storing and Packaging

Various types of compost products can be produced based on the process controls utilized

Finished Product

Finished Product

Finished Product

Finished Product

Finished Product
Methods of Composting

- Turned windrow
  - (OCRRA Jamesville Facility)
- Aerated static pile
  - (OCRRA Amboy Facility)
- Aerated, turned
- In-vessel - batch, continuous flow
- Tunnels
- Combinations

OCRRA Amboy Compost Production

Where to find Compost
NYS DEC - [http://www.dec.ny.gov/chemical/8798.html](http://www.dec.ny.gov/chemical/8798.html)

Animal Mortality Composting

An environmentally friendly way to dispose of road-killed wildlife with the added benefit of creating a useful product.

Mary Schwarz of CWMI will take time to tell you more about this program.
**PATHOGENS**

- Fecal Coliforms
- Esherichia coli
- Salmonella
- Fecal Streptococci and Enterococci

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**Pile Building**

Spiral colon and blind sac removed from deer – portions of the intestinal tract with the highest bacterial load.

Contents mixed and put in retrievable bags and plastic balls for placement in deer.

Pile Building – small ruminants

60 – 70 cm wood chips
2 deer

30 – 35 cm wood chips

Temperature recorded via data loggers – recorded every ½ hour
Removing Samples from the Sentinel Bags

Fecal coliforms and E. coli in Compost over Time

Fecal coliforms

E. coli

Time (in months)

Concentration (log$_{10}$ MPN/g)

Fecal Streptococci and Enterococci in Intestines over Time

Fecal strep

Enterococci

Time (in weeks)

Concentration (log$_{10}$ MPN/g solid)
Fecal streptococci & Enterococci in Compost over Time

Fecal Streptococci and Enterococci Concentration in Compost over Time

Cornell Waste Management Institute
http://cwmi.css.cornell.edu/mortality.htm

CWMI’s Mortality Website
http://cwmi.css.cornell.edu/mortality.htm
Consider Animal Mortality

Composting in your program

Deer Disposal in Florida

Thank you

Compost Uses -
- General Compost common applications
- Compost Use in Erosion Control
- Establishing Roadside Vegetation
- Standards in NYS
- The Seal of Testing Assurance (STA)
  Programs and compost testing

General Compost Uses

- Soil Amendment for Turf Establishment
- Soil Mulch for Erosion Control
- Soil Amendment for Planting Beds
- Soil Amendment for Marginal Soils
- Planting Backfill Mix Component
- Blended Topsoil Component
- Horticultural Substrate (growing media) Component
- Soil Amendment for Silviculture (reforestation)
- Soil Amendment for Vegetable Crop Production
- Growing Media for Soil Production
- Soil Amendment for Field Nursery Production
- Soil Amendment for Nursery Beds

A lot of research exists on compost usage
Garden Beds, Medians

Mulching – using coarser fraction

Turf Establishment, Topsoil Manufacturing

WA DOT
Sediment build up, water percolation

Compost Berms

Compost Filter Berms, then socks

Compost Use is and Accepted and Endorsed Practices

NYS DOT Compost Specs
Erosion Control Specifications

**SPECIFICATION**

**COMPOST BLANKET FOR EROSION CONTROL**

**For Erosion Management with Compost**

**Product Parameters:**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Label</strong></td>
<td>Product label must be legible and durable</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Application</strong></td>
<td>Application rate must be as per site specifications</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Stability</strong></td>
<td>Product must be stable and not disintegrate</td>
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</tbody>
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**Construction Requirements:**

Compost shall be uniformly applied to a depth described below. Areas receiving greater precipitation, possessing a higher soil erodibility index, or which still require accelerated wind erosion shall require greater application rate.

<table>
<thead>
<tr>
<th>Compost Application Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low: 1.0 - 1.5 t/100 ft²</td>
</tr>
<tr>
<td>High: 1.5 - 2.0 t/100 ft²</td>
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</tbody>
</table>

Compost shall be applied in a layer consistent with the soil erodibility index, as indicated by soil type, slope, and vegetation cover. Compost shall be uniformly distributed over the surface to be treated and compacted to a depth of 2-3 inches. Compost shall be mixed with topsoil, if necessary, to achieve the desired depth of coverage. Compost shall be 100% decomposed and free of woody material and vegetation.

**Pictures provided by Filtrex International**
Establishing Roadside Vegetation in the real world

- Mix Compost and Existing soils
- 1 inch spread on top of compost incorporated to a depth of 6 inches
- Mix Soil and Compost (3 Parts Soil 1 Part compost by volume)
- Avoid Excess Compaction
- USCC Has model specifications for your use

Some Actual NYS application
This example using Animal Mortality Compost
Compost for Turf Establishment

Many feedstocks, production methods / technologies, test methods, units of measure, lab result forms....
The ‘industry’ and end users need continuity!

The ‘industry’ and end users need continuity!

Seal of Testing Assurance Program

WHAT IS IT?
- Compost testing and information disclosure program (employing standardized practices)

PURPOSE...
- To assist compost end users purchase the product they require for their particular project
- To assure that compost end users know the characteristics of the compost products they purchase
- To improve overall customer confidence in compost selection and utilization

GOALS:
- To improve customer confidence in compost selection (and utilization)
- To improve overall customer satisfaction, as well as ‘field’ results
- To improve compost purchasing decisions
- To promote customer-oriented composters
- Move industry towards standardized test methods
KEY PROGRAM ELEMENTS, cont’d:

- Participants will test for various parameters
  - pH, soluble salts, nutrients (N,P,K,Ca,Mg), moisture, organic matter, maturity (bioassay), stability (respirometry), particle size, pathogens & trace metals
  - All products will be required to meet 503 pathogen and trace metal requirements, as well as any other relevant state requirements

KEY PROGRAM ELEMENTS, cont’d:

- Specific compost information will be disclosed to customers (and the USCC) using a uniform product label (Compost Technical Data Sheet)
  - Compost Technical Data Sheet contains
    - Compost test analysis results
    - List of compost ingredients
    - End use instructions

KEY PROGRAM ELEMENTS, cont’d:

- Participants must certify that their composting facility is in compliance with all applicable local, state and federal regulations
- All participants must stay compliant with these regulations

Other Benefits

- Acts as a framework to allow the implementation of established numerical product specifications
  - State DOTs, other
- Assists in the implementation of an inspection or quality verification program
- Can serve a quality control function (and promotional benefits) for composters
- Standardizes a set of test parameters (and methods) for use in evaluating compost product quality
  - Some composters have been reluctant to spend money on testing

You’re Not Alone!

- Compost use by DOTs – in erosion control (and other landscaping use) is widespread
- Excellent field results
- STA requirement is becoming more popular with ‘specifying’ agencies

DOTs Requiring STA Certification

- California
- Georgia
- Oregon
- Pennsylvania
- Texas
- Washington State

EXAMPLES
Compost Testing and Analysis

- Important to find tested compost
- NYS calls for STA or tested to the same standard
- Stability Maturity important

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Questions?
And Thank you for Chuck and Mary for your time