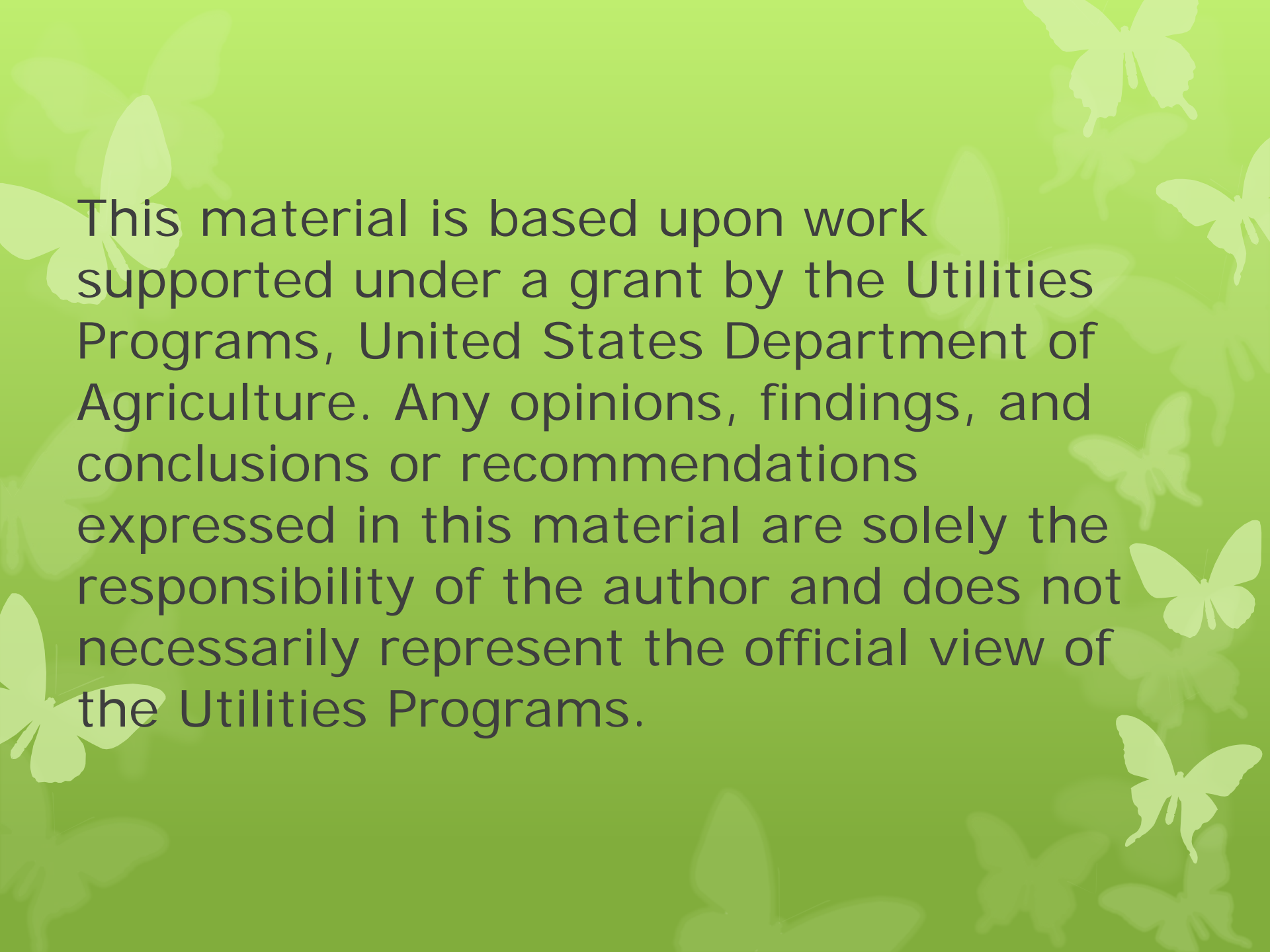




Choosing Organic Amendments

Northeast Recycling Council, Inc.

Athena Lee Bradley



This material is based upon work supported under a grant by the Utilities Programs, United States Department of Agriculture. Any opinions, findings, and conclusions or recommendations expressed in this material are solely the responsibility of the author and does not necessarily represent the official view of the Utilities Programs.

Soil is Life

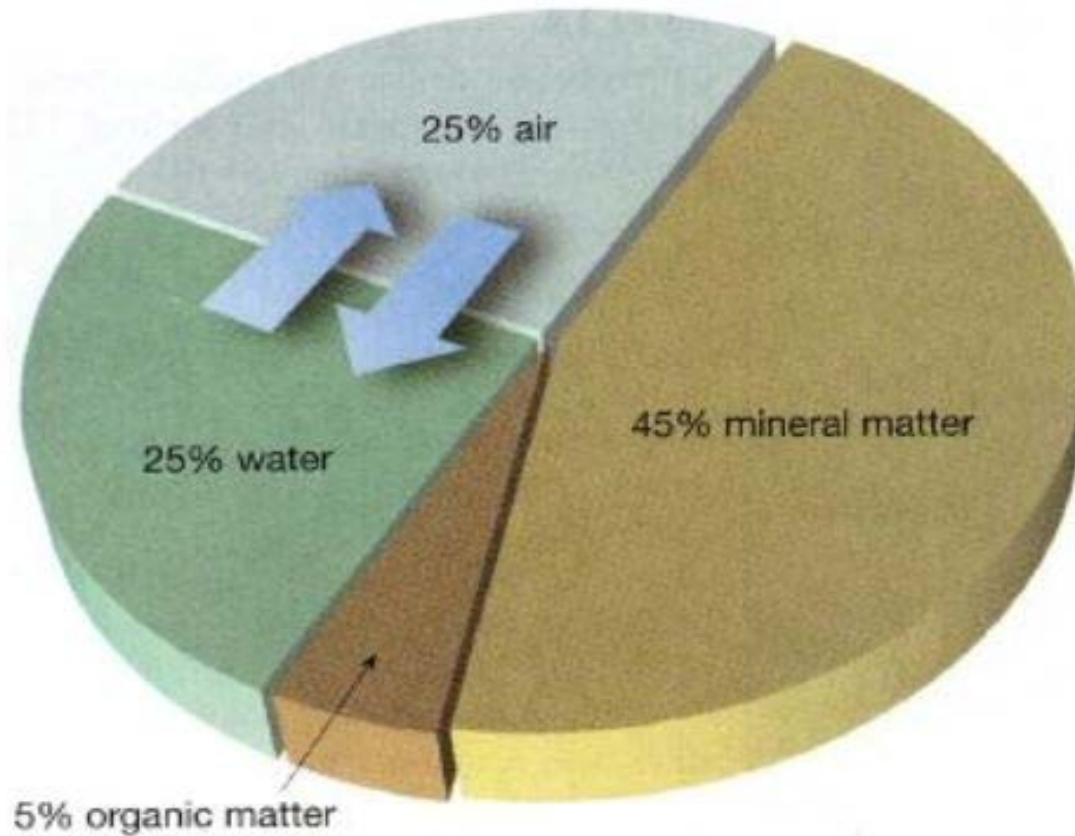
Healthy Soil is:

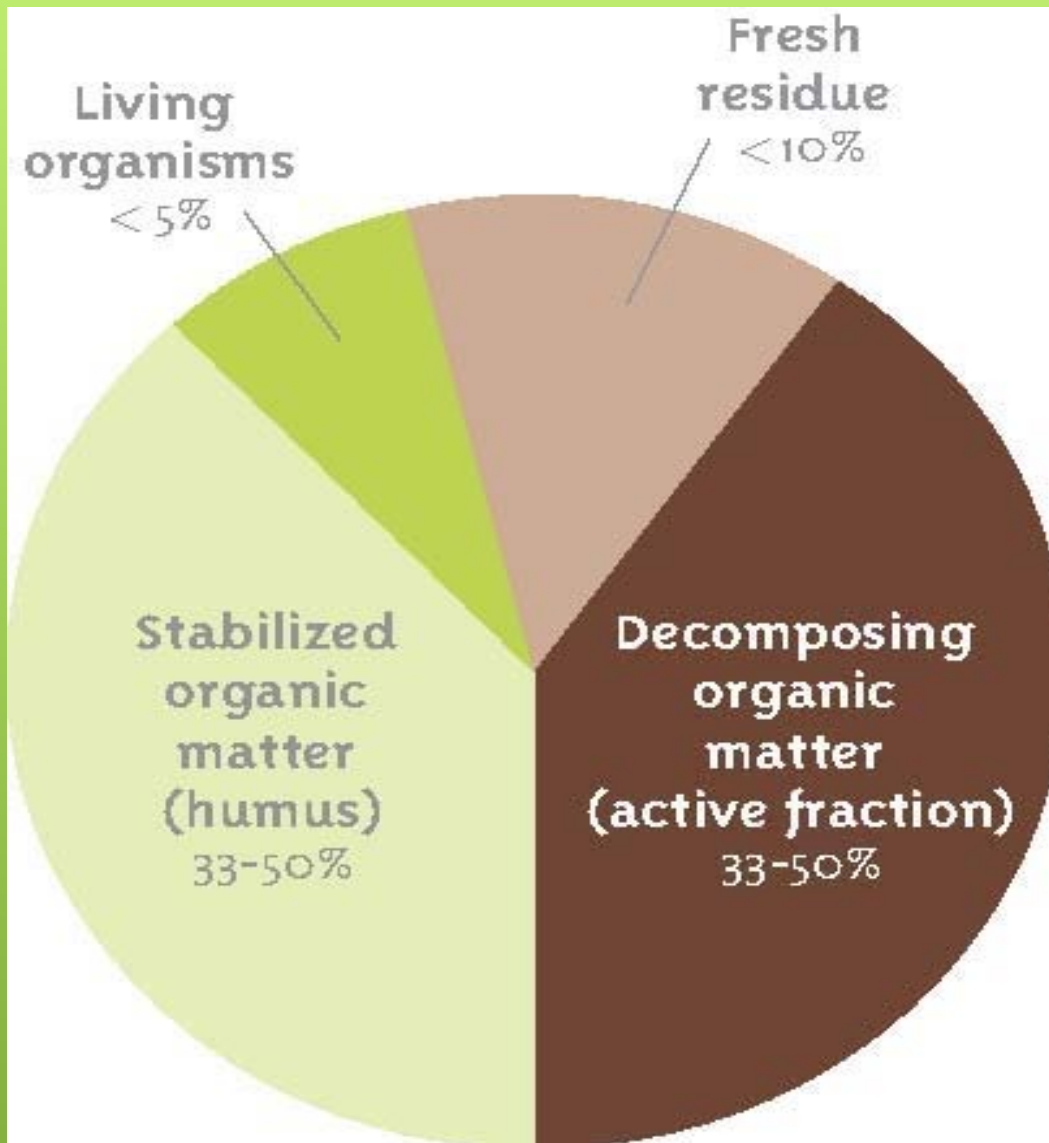
- Key to sustainable agriculture
- Essential for clean water & air
- Home to microorganisms
fundamental in all ecosystems

Soil and soil health is critical for natural resource systems and for feeding the world's ever growing population.



Typical soil make-up





✓ Foundation of a healthy & productive soil

✓ Links the biological, chemical & physical properties of soil

Organic Matter in Soil

- Typically found in top six inches of soil
- Varies from less than 1% (loamy sand) to 90% (bog)
- Is dynamic, not static



Organic Matter Benefits

- Stores & supplies plant nutrients
- Stabilizes & holds soil particles as aggregates
- Helps soil resist compaction
- Promotes water infiltration & reduces runoff

Benefits, cont.

- Aids plant growth by:
 - Improving soil ability to store & transmit air & water (porosity)
 - Improving water holding capacity & drought resistance
- Makes soil more friable
 - Easier for plant roots to penetrate

Benefits, cont.

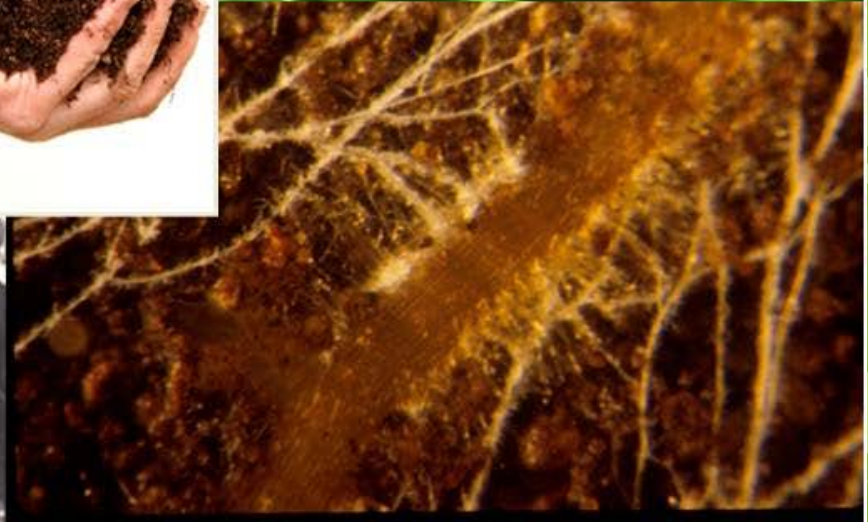
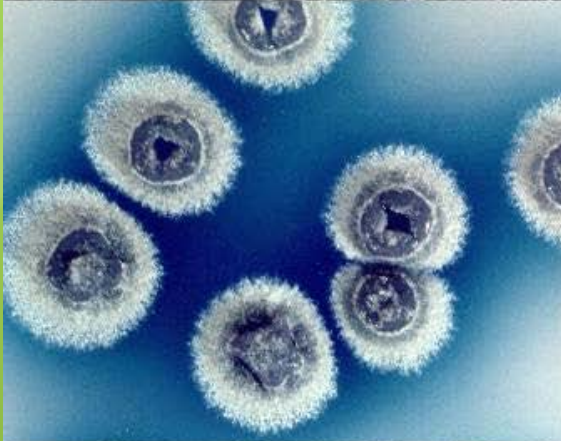
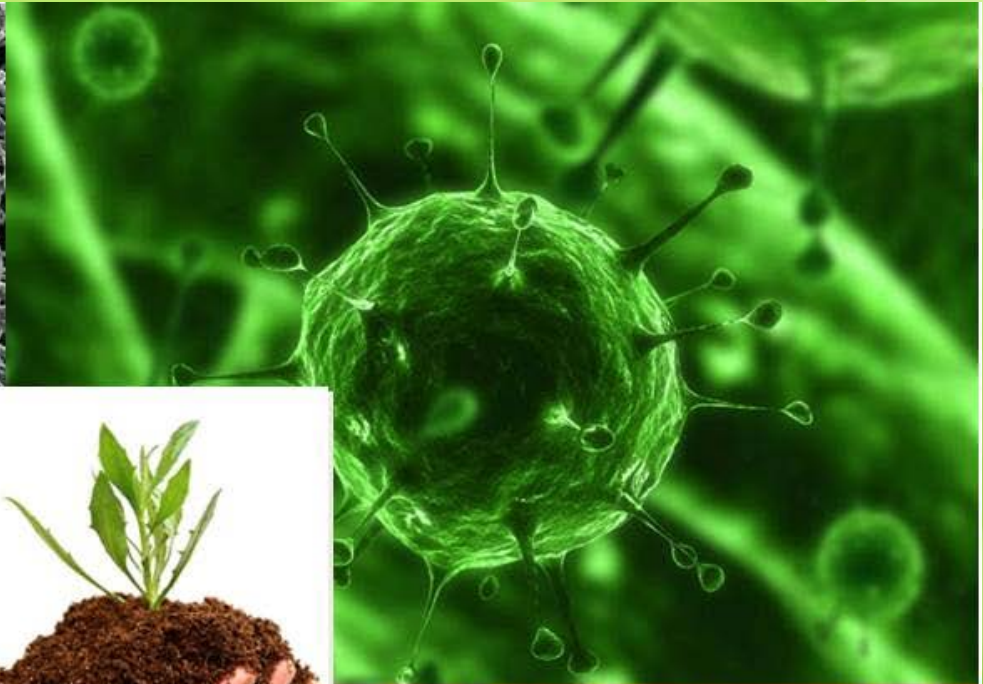
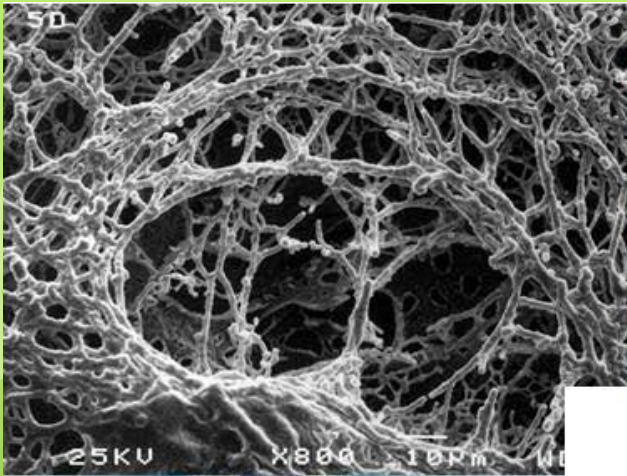
- Source of carbon & energy for soil microbes which cycle nutrients & help fight plant diseases
- Reduces environmental impacts of pesticides, heavy metals, other pollutants

Building Soil Organic Matter

- Determine your soil management goals
 - Do you want to build organic matter quickly?
 - Do you need to supply nutrients in the first year?
 - Or, is the main goal to improve soil structure over time?

Soil Organisms

- Bacteria
- Fungi
- Actinomyces
- Protozoa
- Nematodes
- Arthropods
- Earthworms



Roles of Soil Organisms

- Decomposition of residues
- Nutrient cycling
- Aggregation & porosity
- Contaminant breakdown
- Nitrogen fixation
- Enhance root function
- Pathogens/Predation

Organic Amendments

Fertilizer vs.
soil conditioner

Fertilizer

- Readily available nutrients
- Direct, short-term effect on plant growth
- Small amounts required
- Easily applied
- Animal manures & biosolids
 - Organic amendments with fertilizer value

Soil Conditioners

- Affect plant growth indirectly
- Main benefit is organic matter
- Improve physical & biological properties of soil
 - Water retention
 - Aeration
 - Microbial activity & diversity

Soil Conditioners, cont.

- Not considered fertilizer substitutes, but vital for building soil organic matter
- Yard trimmings, compost

Cover Crops and Green Manures

- Protect topsoil, decreasing soil erosion
- Cover crops reduce leaching losses by utilizing excess nutrients



Animal Manures

- Raw manures: good source of N, P, K, organic matter
- Application rates vary
- Raw or composted
- Raw: higher nutrients
 - Salts, persistent herbicides, weed seeds, pathogens, P loading

Crop Residues

- Add organic matter
- Remove diseased plant residues
 - Rotating crops reduces transmission
- Spoiled hay, straw, silage
 - In fall or at least 2 months prior to planting to avoid nutrient tie up

Yard Trimmings

- Leaves, brush, grass
- Composted or applied directly
- Fresh – apply in fall
- Composted – quality varies; make sure biologically stable
- Grass may contain herbicides

Biosolids

- Class A – lower pathogen loads
 - Suitable for turf, home gardens, vegetable crops
 - If not composted first, can lead to P build up in soil

Paper Mill Waste

- Apply in fall if high C:N ratio to allow time for decomposition
- Test for toxins or get certification from mill
- May increase soil pH if not composted first

Compost

- Value-added product
 - Converts waste material to easy-to-handle, useful product
- Soil-like material, rich in organic matter & organisms
- *It is not:* mulch, fertilizer, manure, peat moss, topsoil
- *It is not just one product!*



- ✓ Yard and landscape trimmings—leaves, grass clippings, & tree & brush trimmings
- ✓ Agricultural and land-clearing/forestry debris
- ✓ Manures and biosolids
- ✓ Food scraps and food processing residues
- ✓ Non-recyclable/soiled paper—napkins, paper towels, pizza boxes & other paper products
- ✓ Items manufactured from organics—compostable bags, utensils, plates, cups and bowls made from corn and potato starch, bagasse, PLA and similar materials

Making Compost

- Ideally two or more ingredients
- C:N ratio between 25-40:1
- Moisture content 40-55%
- Kills weed seeds & pathogens if proper temperatures achieved

Benefits of Compost

- Improves chemical, physical, & biological characteristics of soil
- Improves water retention
- Promotes soil structure by increasing the stability of soil aggregates
- Microbial activity

Benefits of Compost on Soil

Improves Physical Properties: Increases water retention; improves soil aeration and structural stability; resistance to water and wind erosion; root penetration; soil temperature stabilization.

Enhances Chemical Properties: Increases macro- and micronutrient content; availability of beneficial minerals; pH stability; converts nutrients to a more stable form, reducing fertilizer requirements.

Improves Biological Properties: Increases the activity of beneficial micro-organisms; promotes root development; can increase agricultural crop yields; suppresses certain plant diseases; acts as biofilter, bonding heavy metals.

Quality Knowledge

- Moisture – affects handling
- Particle size - $< 1''$
- Organic matter – 40 to 60%
- Nutrients
- Salts
- Biological stability
- Contaminants

Quality...

Defined in relation to its use

A compost product that is good for one use, may not be appropriate for another.

Matching Feedstocks and Compost Products

PRODUCT	Good	Not So Good
Mulch/Erosion control	Bark, wood, lumber, green organics, brush	Manure, biosolids mushroom
Soil amendment– field, turf soil, sod, landscape beds	Green organics, manure, biosolids, food, mushroom	Wood
Topdress – turf and field soils	Manure, grass, leaves, food, screened biosolids & green organics	Wood, unscreened green organics,
Soil amendment – organic agriculture	Manure, green organics w/o pesticides	Biosolids, grass w/ pesticides
Land reclamation/landfill	Contaminated green organics, MSW	Clean, nutrient & OM rich

Source: Rynk, SUNY Cobleskill

General Character of Compost Products

CHARACTERISTIC PRODUCT	Nutrients (N)	Particle Size	Maturity	Salts	Contamination	Price
Mulch/Erosion control	<i>Low</i>	Large	<i>Mod.</i>	Mod.	<i>None</i>	Mod.
Soil amendment—field, turf soil, sod, landscape beds	<i>Mod.- high</i>	Mod.	<i>Low-mod.</i>	Mod. – high	<i>Low</i>	Mod. - high
Top dress – turf & field soils	<i>Mod.- high</i>	Small	<i>Mod.</i>	Mod.	<i>Mod.- high</i>	Mod.
Soil amendment – organic agriculture	<i>High</i>	Mod.	<i>Mod.- high</i>	Low-Mod.	<i>Mod.- high</i>	Mod.

Source: Rynk, SUNY Cobleskill

Character of Products, Cont.

CHARACTERISTIC	Nutrients (N)	Particle Size	Maturity	Salts	Contamination	Price
PRODUCT						
Potting soil	<i>Low</i>	Small-mod.	<i>High</i>	Very low	<i>None</i>	High
Topsoil, manufactured soil	<i>Low-mod.</i>	Small-mod.	<i>Low</i>	Mod.-high	<i>Low</i>	Low-mod.
Land reclamation	<i>Low-mod.</i>	Small-large	<i>Low</i>	Low-mod.	<i>Mod.- high</i>	Low
Landfill cover	<i>Low-mod.</i>	Small-large	<i>Low</i>	Low-Mod.	<i>Mod.- high</i>	Low

Source: Rynk, SUNY Cobleskill

What's on a Label/Promotion

- NPK
- pH
- Organic matter
- Salts
- Feedstocks/Ingredients
- How to use/Applications

What's on a Label?

Superior Products - Seacoast Farms Organic Compost - New Hampshire's Own

Introducing Our Newest Product, 'PayDirt'

Seacoast Farm's compost is accepted by the State Department of Agriculture for use on certified organic farms and in organic planting applications. Our compost is compliant with NOP Section 205.203(c)(2).

Our manufactured topsoils include two basic products:

Natural organic compost and our specially blended Superloam, a blend of our compost and finely graded loam to create a supercharged lawn foundation. Both products have significant benefits over standard loam.



Customer Education

How Much Compost to Use

- Estimate the planting area (Math Hint: Square feet = length x width)
- Decide upon the appropriate application depth of the compost (page 4)
- Use the charts below to estimate your compost needs. (Abbreviations: ft = foot; yd = yard; sq = square; cu = cubic.)
- Conversions: 9 square feet = 1 square yard; 27 cubic feet = 1 cubic yard.

Question: *I have a plot about this big, how much compost do I buy?*

Plot Size	# of Sq Feet	1/2" Deep - Mulching or Top-dressing	2" Deep - Amending new lawns or gardens
5' x 10' plot	50 sq ft	2.08 cu ft of compost	8.33 cu ft of compost (0.31 cu yd)
10' x 10' plot	100 sq ft	4.17 cu ft of compost	16.66 cu ft of compost (0.62 cu yd)
20 x 50' plot	1000 sq ft	41.7 cu ft of compost	166.7 cu ft of compost (6.2 cu yd)
1 acre	43,600 sq ft	1,815 cu ft of compost (67 cu yd)	7,257 cu ft of compost (268 cu yd)

NERC Can Help

We're experts in

- Waste reduction & recycling
- Recycling program design & implementation
- Organics management
- Green procurement
- C&D reuse & recycling
- Electronics recycling
- School reuse, recycling & composting
- Textile recycling programs
- Multi-stakeholder dialogues & negotiations
- & More!

**Fee for service program
makes NERC's sustainable
materials management
expertise available at a
reasonable price with
outstanding results**

Athena Lee Bradley

athena@nerc.org
802.254.3636

www.nerc.org

Free Upcoming Webinar

Community Composting Lessons from New York City & Beyond

September 16, 2014

1:30-3 pm (EDT)