

FOOD WASTE MANAGEMENT & COMPOSTING

Issues & Opportunities

Brought to you by:

Northeast Recycling Council

Lakes Region Planning Commission



Community Composting Project

- 6 States: Connecticut, Maine, Massachusetts, New Hampshire, New York, & Vermont
- Goal: Create at least one sustainable community compost site in each state for managing food scraps & other organics

Community Composting Project

- Training course & multimedia training resources
- Remote, local & regional trainings
 - ✓ At least three onsite trainings
- Technical assistance & support
- Each site receives \$1,000 for development

Community Composting

- Produces compost for local use
- Promotes community connections
- Builds resident food waste management awareness & participation
- Can play an essential role in the evolution of food scrap diversion

Community Composting, cont.

- Often volunteer run; some staffed
- Garden groups, neighborhoods, nonprofit organizations, public sector, farms, schools, other
- Range of sizes - 10 sq. ft. – 20,000 sq. ft.
- Range of compost systems

FEED STOCK COLLECTION



What's your goal?

How much volume can your site handle?

How much volume can your team handle?

Acceptable Materials

- Fruit & vegetable scraps, peels
- Bread/pastries, pasta, rice, beans
- Nuts & nut shells
- Coffee grounds/filters & tea bags
- Leaves, garden trimmings
- Napkins, paper towels
- Sawdust
- Livestock bedding/manure
- Straw



Food Scraps Sourcing

- Community gardeners
- Schools
- Businesses
- Nonprofits
- Churches
- Community

- Start collecting small volumes & grow it!
- Year-round, consistent supply of feedstocks!

Barre Town, VT

Senior citizen multi-family housing



Carbon Sourcing

- Wood workers, town, utility crews, landscapers – sawdust, chips
- Neighborhood, landscapers – leaves
- Farmers – livestock bedding



- Year-round, consistent supply of feedstocks!
- 2-3 times volume than food scraps
- Keep Dry

Community Garden Collection





Images Cr.: BioCycle.net



Image Cr.: Elements Mountain Compost

Science of Composting



What is Composting?

- Controlled, aerobic biological process
- Compost is a value-added product
- Humus-like product
- ✓ Adds organic matter, nutrients, organisms to soil



Raw materials

Organic matter - including carbon, chemical energy, protein and nitrogen

Mineral nutrients - including nitrogen and other elements

Water

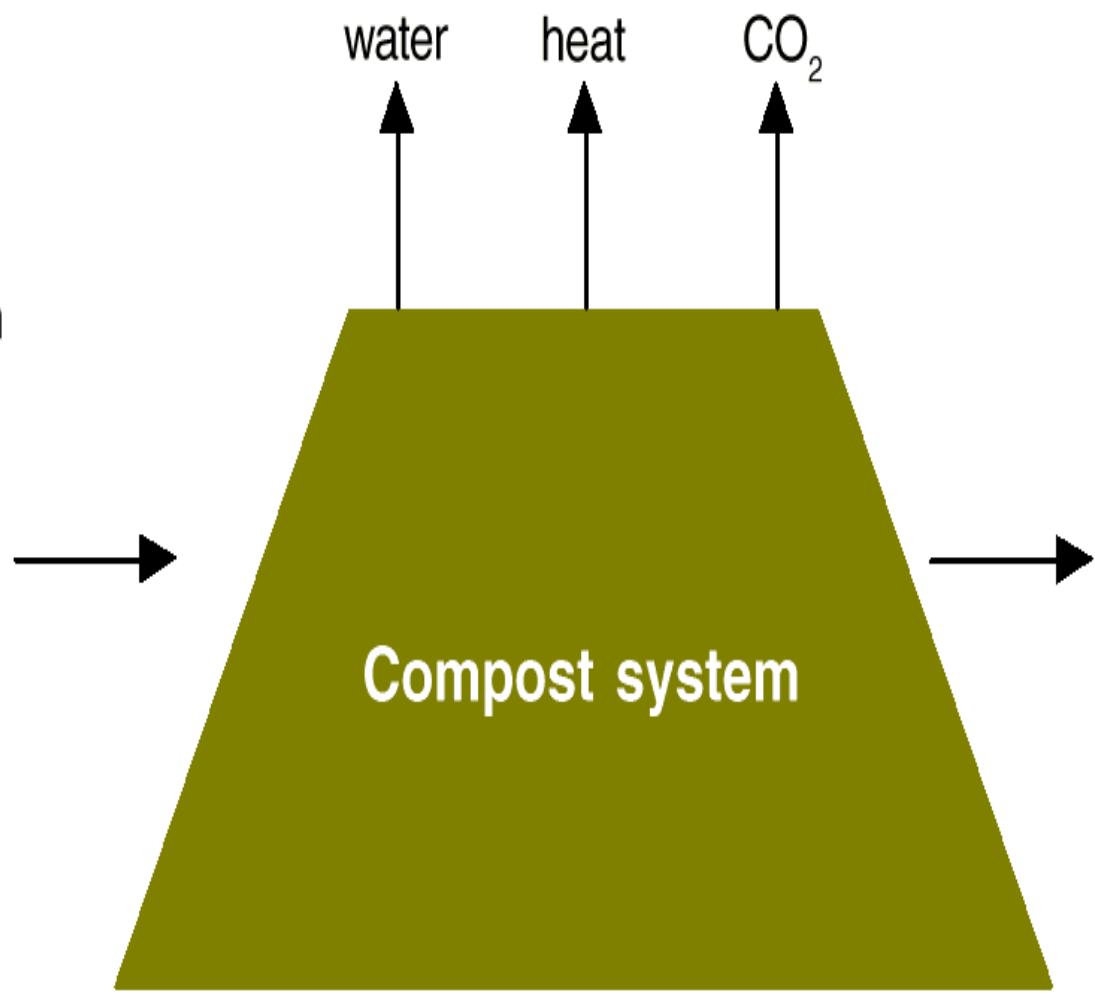
Microorganisms

Process

water

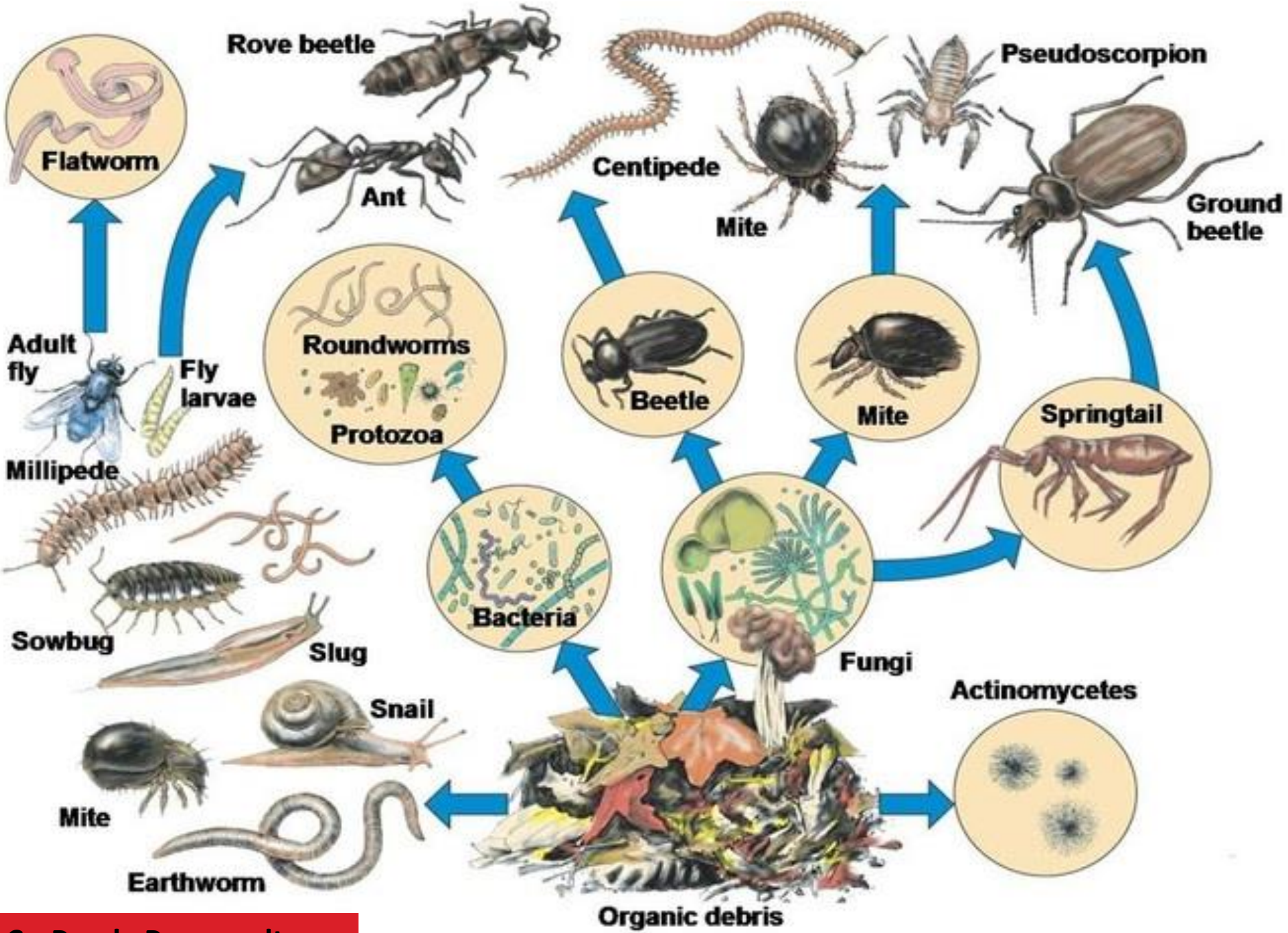
heat

CO₂



Product

Finished compost containing organic matter - including carbon, chemical energy, nitrogen, protein, humus, mineral nutrients, water and microorganisms



Composting Science Basics

- **Aeration**
 - ✓ Oxygen concentrations: 10-14+%.
- **Carbon to Nitrogen (C:N) Ratio**
 - ✓ 20:1 – 60:1
 - ✓ Preferred 30:1-50:1
- **Moisture: 40 to 65 percent**
 - ✓ Like a damp sponge

Science, cont.

- **Optimum pH range**
 - ✓ 5.5 to 8
- **Temperature – 90°-150°F (32°-66°C)**
 - ✓ *Process to Further Reduce Pathogens*
 - ✓ **131°F for 3-15 days (*f* of system)**

Basic Recipe

- **2-3 Parts Carbon - “Brown” materials**
 - Woody, dry materials: wood shavings, leaves, soiled/shredded paper, straw, animal bedding
 - Bulky materials, including branches should be chopped or shredded
- **1 Part Nitrogen - “Green” materials**
 - Fresh, “wet” materials, such as kitchen scraps, grass clippings, garden trimmings (no weeds), manures
- **Keep it small!**
 - ✓ Mowing, grinding, chipping, or shredding

Tumblers - 1 Part C: 1 Part N
Wood shavings recommended

???

**Does your site
have enough
of the right
mix?**

Recipe, Cont.

- **A little soil, finished compost, or horse manure**
 - ✓ Inoculates composting materials
- **Moisture**
 - ✓ Squeeze test - like a damp sponge
 - ✓ Required to keep microorganisms alive & active

Sample Carbon & Nitrogen Ratios of Various Organics

Carbon Sources	Carbon:Nitrogen Ratio
Yard wastes	50 - 90:1
Straw/hay	50 - 80:1
Wood chips/sawdust	250 - 500:1
Nitrogen Sources	Carbon:Nitrogen Ratio
Vegetable scraps	10 – 30:1
Fruit scraps	10 – 30:1
Grass & garden gleanings	10 – 20:1
Chicken manure	10 – 25:1
Cow manure	20 – 30:1
Horse manure	25 – 30:1

Adapted from Robert Rynk, "On-Farm Composting Handbook," Natural Resource, Agriculture, and Engineering Service, 1992.

General TIPS

- Mix ingredients together to create a homogeneous mix
- Adding food scraps
 - ✓ No more than 20%, more okay in tumblers/Jora
 - ✓ Balance C:N ratio, moisture, bulk density
- Observation, temperature, look & feel of compost, trial & error

COMPOST SYSTEMS & OPERATIONS



System Considerations

Available materials
Community need/goals
People power/skills
Site capacity
Permit/regulatory limits
Resources available –
funding, supplies, etc.



Charlotte Central School, Charlotte, VT;
Red Hook Community Farm, Brooklyn, NY
(photo credit NYC Master Composter
Manual, DSNY)

Tumblers



Jora & Aerobin



Compost Bins



3-BIN SYSTEM



Photo Cr.: George McDonald, Maine DEP

Windrows



Images Cr.: David Hurd, GrowNYC

Aerated Static Piles



Images Cr.: David Hurd, GrowNYC

In-Vessel

The Dirt Factory community composting facility in University City
Image Cr.: PlanPhily







Site Plan

- ✓ Composting method
- ✓ Safety & fire emergency plan
 - ✓ Security & vandalism concerns
- ✓ Monitoring techniques & record keeping
- ✓ Provisions for controlling odors
- ✓ Contingency plans

Ludlow, Vermont

- Hidden from public view
- Relatively isolated
- Limited winter access



Bennington, Vermont

- In town at Rec Center
- Nearby residents
- Highly visible



Best Management Practices

Set-Backs

- 3 feet from side lot lines
- 10 feet from the front & back lot lines
- Adequate distance from water sources & water bodies
- Consideration of neighbors

BMPS, cont.

- Operated so as to minimize odors, prevent run-off, & not harbor rodents & pests
- Screened from view from public & adjacent neighbors using plants, trellis, or fencing
- A neat site appearance is important

Montpelier, VT



Jora - Active Composting Step 1



Active Composting Step 2

Water

Buffer area

- Highly visible
- In town neighborhood
- Nearby residents

Ludlow Community Compost Site

Jora – Active Composting

3-Bin System

Signage

Food
scrap
collection
bins &
carbon
storage



Fort Community, Burlington



Carbon Storage

**Food
scrap
Tumbler**

**3-Bin
System**

FOOD SCRAPS
No trash - make sure you
remove wrappers and any plastic.
Save your house, chop your food
scraps between 1 and 3 inches
and dump your food scraps inside
the bin.
Keep full of browns after adding
scraps (these can be found in the
"Browns")
Push back on the tumbler and make
sure it is tightly secured.
Turn the tumbler a spin

Signage

Food Scraps you can add to the compost bin:



Fruit & vegetable scraps
(remove PLU stickers!)



Egg shells



Leftover vegetarian meals



Coffee grounds & unbleached coffee filters

Dirty unbleached paper napkins & towels



Do NOT add these to the bin:

Meat & fish



Bones



Grease



Dairy products



Diseased plants



Plastic bags, metal, fruit stickers, glass



Greasy food



Signage



Filling & Mixing in Tumbler



Mixing Food Scraps in Bins



Food Land Opportunity - Chicago



Nola Greens – New Orleans

Mixing into Windrows



Earth Matters - NYC



Food Scrap Mixing/Active Composting

**Curing, Screening,
Finished**

**The Dirt Factory Community Composting
Facility In University City, Pennsylvania**

Monitoring & Troubleshooting

- *Observation*

- ✓ Are the bins or piles steaming?
- ✓ Are materials looking different?
 - ✓ Is decomposition occurring?
 - ✓ Materials looking like soil?
 - ✓ Is the pile uniformly composting?

Monitoring, cont.

- *Compost feel*
 - ✓ Does the squeeze test indicate that there is moisture in the material
 - ✓ Does it feel like a damp sponge & stick together?
 - ✓ Is the material too wet/slimy?

Monitoring, cont.

- *Oxygen*—Smell is the best measure of properly aerated composting
- Unpleasant odor – indicative of anaerobic conditions
 - ✓ Pile needs to be turned

Monitoring, cont.

- *Temperature monitoring*
 - ✓ Is the temperature rising appropriately for rapid compost?
 - ✓ Does the temperature rise to 90°F
 - ✓ Maintain for PFRP (131°F...ideal)

NH Regulations

- Community composting doesn't "fit" under existing solid waste exemptions
- Waiver application
 - ✓ ENV-Sw 302.02 Solid Waste Permit Required
 - ✓ Pilot demonstration under NERC's guidance & with specified parameters

Down to Earth Community Garden St. Albans, Vermont



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