Composting “on site” at community and home gardens

Mauricio Avila
Soil Chemist
Soil and Plant Analysis Lab – UW-Madison

&

Jill Schneider
Community Gardens Coordinator
Troy Community Gardens, Madison

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Why Compost?

- It is a source of highly stable (recalcitrant) carbon that:

Increases: organic matter, microbial activity, water holding capacity, nutrient holding capacity, and total nutrient content

Decreases: compaction, water runoff and soil erosion, weeds, diseases, and other pests (nematodes)

Composting is a tool for:

- “disposal” of garden residues (weeds, chips, branches, etc) by reducing their volume, eliminating disease and pest reservoirs, and recycling highly valuable nutrients such as nitrogen (N), phosphorus (P) and potassium (K)

- recycling of some household wastes such as coffee grinds, most food scraps (except bones and meat), egg shells, etc and keeping them out of the landfill

- **it also promotes exercise in a family setting**

Where to compost?

If you have a garden of any kind:
When you have a home garden (good idea)
If you have a community garden plot (it's a must!)
In school gardens it is a great opportunity for kids to learn

When?

At home you could compost year round
At a community garden plot, of course,
Spring/Summer/Fall

Overall, once the soil thaws and the snow is gone you can start chopping and piling up stuff for composting.

What does it take to compost?

The number one ingredient is:

Motivation!!!!

Once you are convinced and motivated…

Organic residues (lots of them), a few tools to chop and move the materials around, water, and sometimes a porous cover

Plus, one more important ingredient…

Knowledge of the composting process!

The Basics…

Nitrogen (green material)

- grass, green leaves, manure, brewers grain, other

Carbon (brown material)

- wood chips, shredded branches, cardboard, old leaves

Water

- rain and other sources low in chlorine

Heat

- internal, sunshine, protection from cold

More basics…

Tools

- pitch forks, shovels, thermometer (?), moisture meter (?), semi-permeable cover (?)

Time

- 8 to 20 weeks depending on the material

Water monitoring

- squeeze method or moisture meter

Temperature monitoring

- use your hands or thermometer

How about some details…

We need an adequate mix of high nitrogen (leaves, grass clippings, fruit/grain residues) and high carbon residues (branches, old grass, saw dust)

The Carbon to Nitrogen ratio (C:N) should be ~30 at the onset and finish between 15 to 20.

Roughly half of the carbon is lost as CO_2 in the process and the volume reduces to about 1/3 or less

Adequate oxygen is key for the pile to heat up and is provided by coarse chunks and adequate mixing

More details…

If there is enough N, temperature must reach **120 to 150 F** (too hot to stick, and keep, your hand inside the pile!) and stay there for about 2 weeks

Over those two weeks, turning should happen often (every 2 to 3 days) to enhance aeration and the humification process

When temperature drops below 100 F it can sit in place protected from rain to age for a few months

Compost Recipe
(1:2 green to brown)

- One unit of “green” material (high nitrogen):
  - Grass clippings:
  - Vegetable residues of all kinds and plant parts
  - Fresh leaves

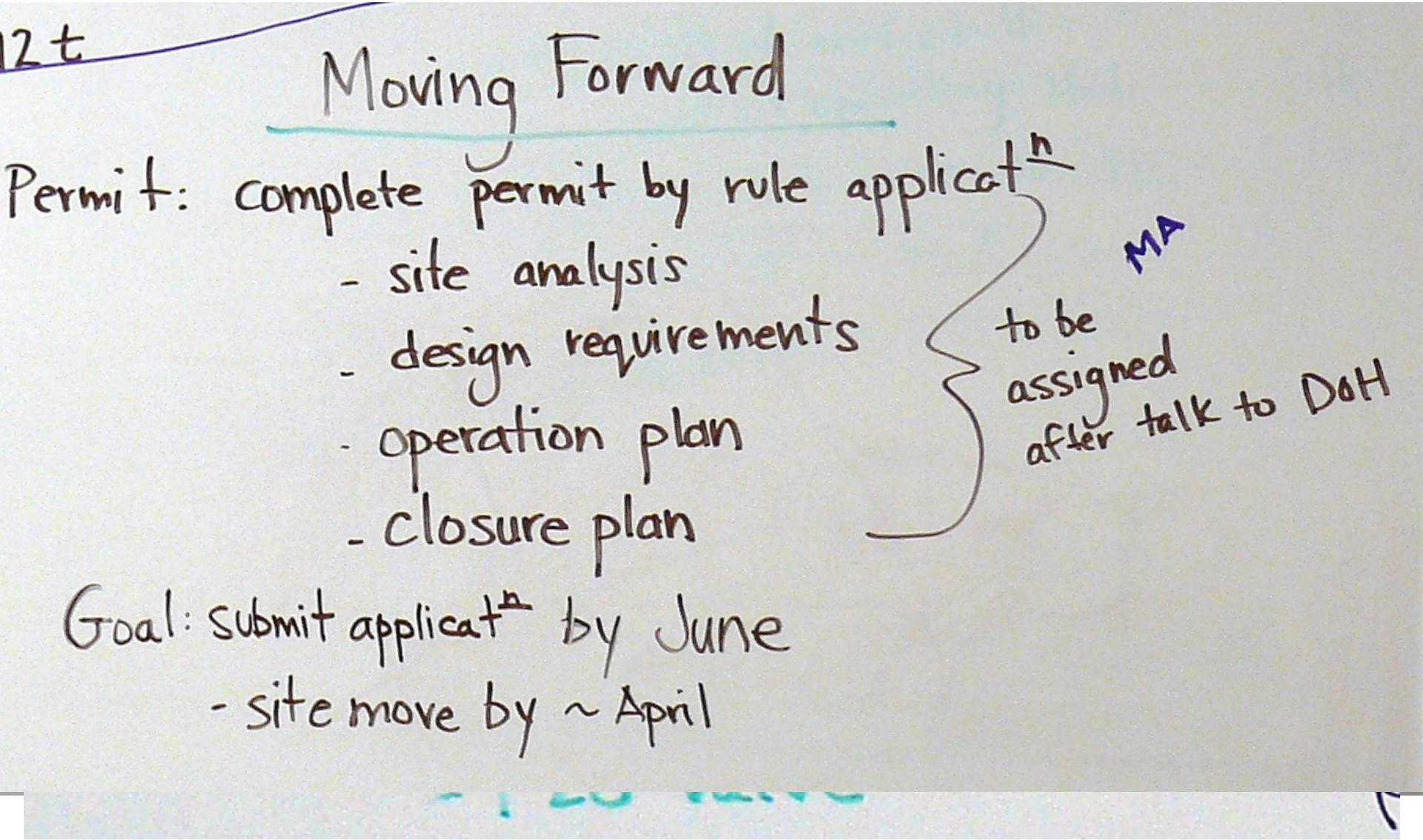
- Two units of “brown” material (high carbon):
  - Old leaves
  - Wood pieces (1 to 4 inch in size):
  - Saw dust
  - Ground tree branches of all sizes

Some tricks for when the mix is not quite right:

- And if I have too little green stuff?
  - Fertilizing? Urea in small quantities! ~1.5 to 2.5 lb of urea in a 3x3 pile that has only about half of the green material needed. **But it is not organic!**

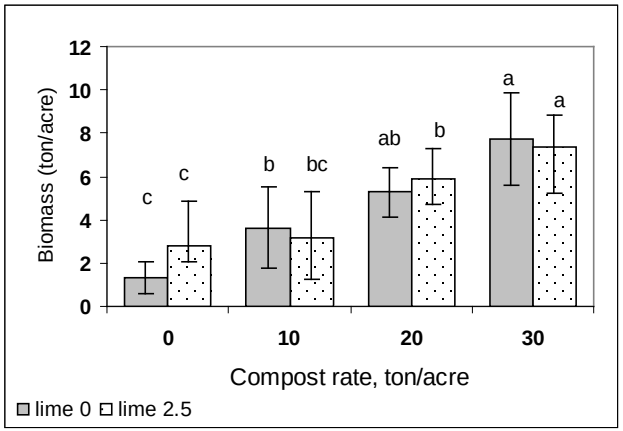
- What if I have too little brown material?
  - Saw dust from untreated wood (purchased or otherwise) to make up the difference

Medium Scale Composting



Different Needs, different scale?

The results we obtained…



The results we obtained…

General increases in nitrogen, organic carbon, phosphorus, potassium, calcium and magnesium are common

pH correction has been critical for the success of our crops and our cover crops

Although compost is not a large source of N, better cycling improves N retention and availability to crops over time.

The results we obtained…

	Sampling		Rate			nutrient contents (lb nutrient per million lbs of soil)					
Location	Date	pH	ton/ac	% N	%OC	NO3	NH4	P	K	Ca	Mg
Garden	mar07	7.4	60	0.35	4.58	44.3	11	88	847	3623	522
Prod. area	jan07	7.3	40	0.36	4.87	33.3	22	92	922	3625	523
Field 1		7.7	30	0.16	2.04	20.5	9	19	595	2850	288
Field 2		6.3	0	0.16	1.91	10.6	18	27	423	1589	228
Field 3	jan07	5.4	0	0.10	1.44	26.2	17	21	265	979	151

Some lessons learned

Compost is effective to restore degraded lands, but expensive

Use of compost in the planting furrow or hole is highly effective

At large scales, sourcing, processing, and mixing in the appropriate proportions is difficult; i.e., TOO MUCH WOOD

Most gardening residue was perfect once it was shredded, so for community gardens SHREDDING IS THE CHALLENGE

Cost of equipment limits handling of large volumes of green waste; hence “COMPOSTING BY PLOT”

Recommendations

Garden Organization:

Compost “by plot” whenever possible

Look at shredding options

Be strict but provide education and support

Individual Gardener:

Build a pile 3 feet wide by 3 feet tall to get good heating

Keep material in broad pile and wait to have enough to compost

Build a second pile if needed (better than adding to old pile)

Recommendations

Individual Gardener (cont):

If you use compost regularly, beware of liming!

P fertilizers are seldom needed if you use your own compost

Parameter	Summer compost	Fresh fine (0.5”) winter compost	Aged fine winter compost	Fresh coarse (1") winter compost	Black Gold commercial compost**
% weight, <2 mm	67.8	45.7	54.4	41.2	
Total Nitrogen, %	1.1	0.54	0.85	0.58	1.26
Organic N %	1.02	0.52	0.83	0.57	1.26
P elemental mg/kg	1336	1408	1172	1087	15.95
K elemental mg/kg	5416	3612	3240	4052	124.8
Ca mg/kg	39000	25000	23000	51000	41.24
Mg mg/kg	6500	5100	4000	6400	16.2
PH	8.36	8.1	8.3	8.58	
EC, mmhos/cm	1.85	0.96	1.11	1.59	0.75
bulk density lb/cf	50	42	50	48.4	
carbonates lb/ton	9.1	4.5	101	188	
organic matter %	19.1	14.6	15.3	25.4	
organic carbon %	13.9	7.6	11.2	9.7	43.32
Ash %	80.9	85.4	84.7	74.6	
C:N ratio	13	14	13	17	34
moisture %	28.8	25.8	32	34.2	

Other properties: Copper, zinc, manganese, boron, sodium, chloride, fecal colliforms, salmonella, nitrates, ammonium

Challenges for Troy Community Gardens

- N
- N
  p
- L
  w
  b
- P

Going Pile-less at Troy!

- First, made gardeners aware of the policy change and explained why we were changing the policy.
- Got rid of the pile that existed (actually pushed it out of sight)!
- Educated the gardeners in how to compost within their plots
- Threatened to penalize gardeners who dump weeds outside plot boundaries

Stop gardeners you see with wheelbarrows that look like this!

Education for Gardeners at Troy

- Held a work shop taught by a composting expert and one of our Hmong gardeners:
  - Joan Laurion, Composting Educator and proprietor of BuckleUp Compost™ www.buckleupcompost.com (good information on her web site)
  - Hmong gardener described methods she uses to chop up garden debris and bury it or mulch with the material.
- Followed up work shop with an article in gardener newsletter about how to compost within plot

What did we learn at Troy?

- Gardeners didn’t want to take up space in their plots.
  - Remind them composting can be as basic as laying down your large leaves as mulch and burying your chopped up plant debris in the fall.
- Be persistent in your communication about the policy and why.
- Challenge gardeners who are not following the policy.

We no longer have a weed pile!!!

Carpet Mulching

Some useful resources

- Master Composter Workshop
  - Dane County UW-Extension office at 1 Fen Oak Court, Madison
  - Tuesday, March 8th and March 15th from 6:00 p.m. to 9:00 p.m.
  - Pre-registration is required.
  - Cost is $30
  - http://dane.uwex.edu/2011/02/10/upcoming-training-for-master-composters/

- Wisconsin DNR Home Composting page (A trove!!!)
  - http://dnr.wi.gov/org/aw/wm/recycle/homecompost.htm
- Organic soil conditioners
  - http://learningstore.uwex.edu/Assets/pdfs/A2305.pdf
- 4-H Organically Grown Handbook
  - http://learningstore.uwex.edu/Organically-Grown-Handbook-P760.aspx
- Dane County UW-Extension office
  - http://dane.uwex.edu/
- Home Composting brochure from Cornell University
  - http://cwmi.css.cornell.edu/compostbrochure.pdf
- US composting Council
  - http://compostingcouncil.org/


Questions?