



# **BioComplete™ Compost**

Lecture 4 – Thermophilic Composting (Part 2)

# Storing Starting Materials

- **Gather starting materials.**
- **Arrange all high N materials in one section, greens in another and woody materials in a third section.**
- **In general, dry the materials to prevent decomposition. Freezing high N and greens is an option if drying is difficult.**
- **If material must be stored moist, then make certain the piles are kept aerated.**
- **Inoculate woody materials with handfuls of high-fungal compost or spawn.**

# How Much of Each Starting Material?

**Determining the BioComplete™ Compost recipe is an iterative process.**

**C:N ratios of plant materials change from early spring (high nutrients concentrations from root-stored nutrients).**

**Less volume/amount of high N materials would be used in the spring, while later in the summer, higher amounts would need to be used.**

# Determining the BioComplete™ Compost Recipe - Iterative Process

**High N and Green materials need to be dried rapidly once cut, or sugars, amino acids, and proteins will be decomposed, reducing the ability of the pile to reach desired temperatures for long enough.**

**Green materials feed bacteria and often correlate with maintenance of high temperatures. We only need high temperatures to be maintained until all parts of the pile have been rid of diseases and pests.**

# Determining the BioComplete™ Compost Recipe - Iterative Process

**Woody materials feed fungi and if conditions remain aerobic, the beneficial fungi are selected. Fungi tend to be slower growing than bacteria, and thus inoculating woody materials with beneficial fungi, so these fungi are already present and growing on the woody material when the pile is started will result in a much better BioComplete™ Compost.**

**Addition of woody materials when temperatures take off wildly can often shut down extreme increases in temperature.**

# How Much of Each Starting Material?

## **High N (party food) C:N 10:1 – 20:1**

- 10% in summer; 15 to 20% in winter
- However, the first time you use a new source of “high N”, you find out just how hot it is. Iterative process to determine how much to use for future piles.

## **Green (bacterial food) C:N around 30:1 -60:1**

- 30% depending on how much bacteria needs to be replenished. More bacterial food can be used to increase bacterial growth, and less fungal food would be added.

## **Woody (fungal food) C:N above 60:1**

- 60% depending on need for fungi to be replenished. More fungal foods can be added but usually temperatures lag. Since fungi usually are lacking in most ag soils, we designed the compost to have high fungal foods.

# Work out the recipe!

## **1. Suggested starting point:**

- 10% High N
- 30% Green
- 60% Woody

## **2. Determine total volume for your pile.**

- Trial piles should be just large enough to maintain thermal mass through a cold night.
- Make small piles to inoculate windrows of “commercial” compost.

## **3. Using 5 gallon (20 L) buckets, measure out the right amount of each starting material that should go into the pile.**

# Example Small Pile

Use ten 5-gallon (20 L) buckets, fill buckets as follows.

Use two sets of ten buckets for a 20 bucket pile.

Three sets of 10 buckets for a 30 bucket pile

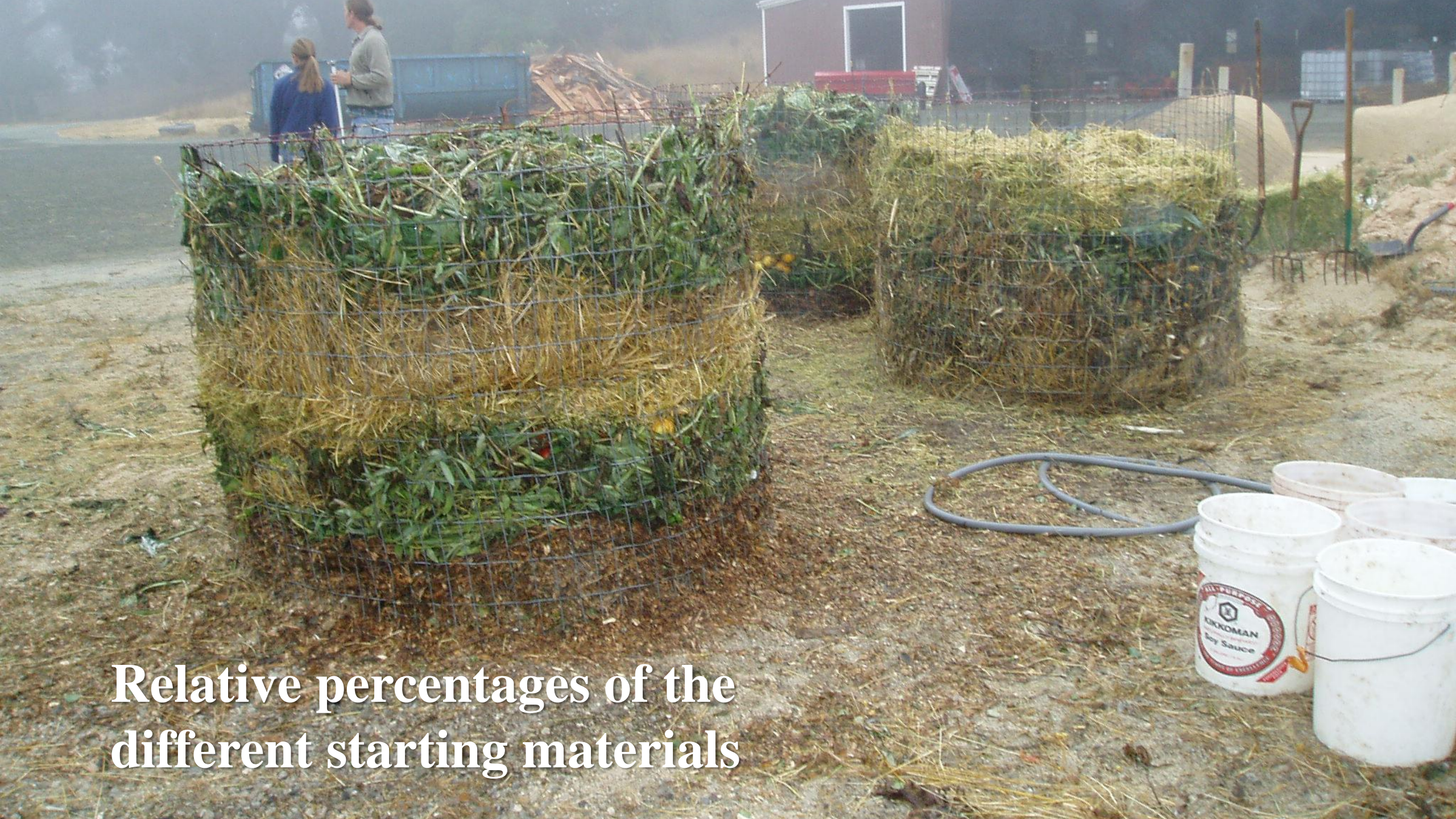
Etc...

High Nitrogen C:N 10 - 20	Greens C:N 30 - 60	Woody C:N 60 - 500
Legumes, Manure	Veggies, Grass, Scraps	Paper, Wood, Dead Leaves



# Example Small Pile





Relative percentages of the different starting materials

# Bring Moisture in the Starting Materials to 50%

**Wet up the starting materials by adding WARM water to the buckets. The amount of water to add depends on how dry the plant material is.**

**Compress the plant material in your hand: Crackly dry? Fill the bucket half way with water.**

**Somewhat pliable? Fill the bucket 1/3 full.**

**Easily compressed? Fill the bucket 1/4 full.**

**Green plant material? Do not add any water.**



# Bring Moisture to 50% - Maintain at 50%

**Let the starting materials soak up water overnight.**

**Often all the water doesn't wick up, but most of the starting materials should be wet enough to proceed. Any excess water should be released by tipping the buckets **BEFORE** the next step.**

**On a tarp, dump a third of the high N buckets, a third of the green, and a third of the woody. Mix well, place in wire cage. Repeat two more times until all materials are added in the pile.**



Packing down the  
materials for contact



# When to Turn BioComplete™ Compost

- **Only when the material in the middle of the pile has been hot enough, long enough.**
- **If anaerobic smells are detected, punch chimneys!**
- **Turning is not done on a whim, or “once a week whether it needs it or not”.**



# Keeping the Pile Aerobic

- **At the start, physical structure must be provided by having 5% of the pile be 1 inch size chunks.**
- **Organisms build aggregates, air passage ways to allow air flow into middle.**
- **If growth uses oxygen faster than oxygen can move into the pile, then punch chimneys in the pile to cool temperature and replenish oxygen.**



# Other Types of Compost Containers

- **Many compost containers for sale on the market. What are the critical aspects?**
- **Plenty of openings to let air move through the whole pile?**
- **Easy to get the shovels and pitch forks in?**
- **Ability to water?**





# Stacking Containers

**Turning is tricky in stacking containers. Removal of the top tray usually results in BioComplete™ Compost falling to the ground. To prevent contamination of BioComplete™ Compost , put tarps down all around the unit to catch materials.**

**Aeration is a big problem --- need more chunky material to open up physical airways. People don't like all that woody as they think that will take N, P, S, etc away from their plants.**

**Aim for the hot middle. Test at least 3 different places**



**Stainless steel, 4 foot  
thermometer**

# Turning





# Practical Demonstration

BioComplete™ Compost Starting Materials