

# Building Healthy Soils Composting in Vineyards

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## What is Composting ?

### Simple definition: Managed Decomposition

- Composting is a natural form of recycling, which continually occurs in nature. This is how nutrients are recycled in an ecosystem.
- This natural decomposition can be encouraged by "managing" ideal conditions
- End products are: compost (humus), CO<sub>2</sub>, water and heat

## Sonoma Compost Site Overview



### Site Considerations

- Allocate enough space
- All weather accessibility
- Water supply
- Proper water runoff management

## **Composting Permit**

http://www.calrecycle.ca.gov/Laws/Regulations/title14/ch31.htm

Excluded: Agricultural materials from site applied to the site. < 1000 cy given away or sold or notification with inspections

Notification: Recommended for any decent sized compost operation Will result in one inspection and a small fee per year.

Full permit: For those facilities using municipal yard debris, etc. >12,500 cy

Don't use?

**Human Feces Cat/dog Feces** Large Pieces of Wood **Diseased Plant** Material (mealy bug) Large Quantity of Grease or Oil **Persistent Pesticides Toxins Compostable plastics** 



## OK to Use

- Grape pomace
- Prunings
- Weeds
- Manures (pesticides, permit issues)
- Grape lees (irrigation substitute)
- Diatomaceous Earth



### Compost Pile at Benziger Winery, Glenn Ellen, CA

- 15-25% of grape mass
- Bulk density 675-1350 lbs/yd<sup>3</sup>
- Moisture after pressing: 20-30%.
- C/N from 15:1 to 45:1

# Food: Carbon to Nitrogen Ratio

- Ideal carbon to nitrogen ratio (C:N) = 30:1
- Browns and greens
- Availability: Wood chips vs head of lettuce
- Layering vs mixing
- Use resources and experience
- <u>http://compostingtechnology.com/resources/compost-calculator-tool/</u>

## C/N Calculation

D Qty	Wood Chips, Softwood	0.4 0.6 0.3 0.63 0.7
D Qty	Green Waste	0.2 0.8 Density
D Qty	Manure, Dairy Cow	45 50 55 60 40 65 35 59 % 70
D Qty	Grape Pomace	30 75 Moisture
		20 $25$ $30$ $35$ $40$ $15$ $40$ $10$ $22:1$ $45$
		5 50+ C:N Ratio

## Stockpiling of Grape Waste



### The Composting Process

A biological process
Water 40-60 %
Oxygen/Porosity (Aerobic)
Food
Time



### Moisture By Feel

Squeeze a handful of compost • > 60% Water drips out • 55-60% Sheen on surface • 50-55% Ball stays when tapped • 45-50% Ball falls apart when tapped • 40-45% No ball forms • < 40% Hand feels dusty dry





#### Before - Factory Nozzles



#### After - Customized Nozzles



From: UC Compost Council, Compost Operators Training Course

### Evaluate the Health of the Pile

Evaluating the Temperature
Size of Pile
Moisture by Feel
Food Composition



#### THE PRESS DEMOCRAT . WEDNESDAY, NOVEMBER 24, 2010

#### LOS ANGELES Indoor compost pile ignites house

A 1,700-plant marijuana grow house in the San Gabriel area erupted in flames when a living room compost pile ignited Monday.

Detective David Mertens said a man was seen running from the home but there are no arrests. Mertens says gangs rent out homes to raise pot and investigators find a couple of similar marijuana grow houses each month.

# Temperature/Turning Log

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# 1-2-3 Rollover

OLVO II

## Meeting Quality Standards

Compost (and mulch) will be meeting these standards:

- Will be kept at a temperature of at least 131 degrees Fahrenheit for at least 15 days during which time the piles will be turned at least 5 times.
- Fecal coliform tested state certified shall be less than 1000 MPN/dgr, and salmonella sp. shall be less than3 MPN/ 4 dgr.
- Metal Concentrations
- Pesticides
- Compost Maturity



## The Role of Organic Matter in Soil: Promote Soil Health

- Soil Structure
- Nutrient management
- Conservation of soil
- Soil moisture management
- Diversity of Microorganisms

Soil Structure

Can't change texture: Make soil workable

> Increases water infiltration rate/ holds water Enhances root penetration

Optimizes soil aeration

Stimulates microbial diversity



## Soil Aggregation

 Aggregation Formation • Clay charge • Root web • Organic glues • Fungal hyphae Aggregation Destruction • Mulch



## Nutrient Management

#### Increase CEC

- Immobilize Water Soluble Nutrients
- Long Term Nutrient Release
- Nitrogen Fixing Micoorganisms



### Soil Moisture Management

Increased Water Holding Capacity (Sandy)
Increased Water Permeability (Clay)



## **Diversity of Soil Microorganisms**



## Diversity of Soil Microorganisms

A Tool in IPM
Increased Competition/Predation
Site Occupation
Nutrient Management
Fungal Presence for Aggregation







## **Microbial Diversity**



#### Combined Foodweb Results

Sonoma Compost Co Will Bakk			(707) 664-1943				S	Submission Number:		r: Sa	Sample Received		Report Sent:			Invoice Number:		ber:
			willbakx@sonomacompost.com					_01-019415			4/1/2009					0		
550 Meach	um RD																	
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Customer Reference	ID	Dry Weight	Active Bacteria	Total Bacteria	Active Fungi	Total Fungi	Hyphai Diameter	Flagellates	Protozoa Amoeba	Ciliates	Nematod	VAM	TF/TB	AF/TF	AB/TB	AF/AB	Nitrogen	Actino Bacteria
Soil Amendme	ent																	
BDCCSF Mar	01-107003	0.50	84.8	1007	13.6	466	2.85	11529	11529	567	3.69	N/A	0.46	0.03	0.08	0.16	100-150	6.61
BDCSSF Mar	01-107004	0.460	133	775	28.1	492	2.9	59799	29899	299	7.31	N/A	0.64	0.06	0.17	0.21	100-150	17.8
BDCPSF Mar	01-107005	0.430	117	913	13.5	992	2.85	13372	32217	3221	19.3	N/A	1.09	0.01	0.13	0.12	100-150	115

# Feed the Cover Crop



#### **Compost Rate Worksheet**

Date: 2/16/2012 Vineyard Block: Example Compost Source: Compro Soil Amendments Compost Type: Grape Pomace Source Contact: Johnny Massa

		omnact	Vetriant	_	Estimated Nutrient Available	Estimated Release Ibs/Ton	Desired Nutrient	Compost Rate	Total	Total Compost	Total Compost	
		ompost	Nutrient	5	Teal 1	Composi	rei Acie (ibs.)	TONSACIE	Mores	order (tons)	order (ya -	
		% wet	Ib/yd	Ib/ton	0.00	10.40	-	4.0	e	1 24	50	
	N	2.02	21.2	52.4	0.20	10.48	20	4.8	þ	29	28	
	P	0.99	8.0	19.8	0.40	7.82	30					
	ĸ	3.13	25.4	62,6	0,60	37.56	1/9					
	Ca	1.14	9.2	22.8			Ť					
	Mg	0.55	4.5	11.0			If you apply 5 ton	s of compost/acre,				
	5	0.20	1.6	4.0			50 pounds N/acre	will be avialable in	1			
	Na	0.11	0.9	2.2			vear one, as will 3	8 pounds/acre P	-			
	AI		0.0	0,0			and 179 nounds/s	acre K				
	Fe		0,0	0,0			and the boundary					
	Mn		0.0	0.0								
	Cu		0.0	0.0								
	8		0.0	0.0								
	Zn	1	0.0	0,0								
Wt/Vol	lb/yd <sup>3</sup>	810	Range i	s 800 ti	o 1000 lbs							
-	pН	7.2										
Notes:												
Compos	it rates b	based on (	(limited b	y) desir	ed N rates							
Actual N	based o	on 20% re	lease in	year 1.	1st year releas	se considered only.						
P and K	release	estimated	as 40%	and 60	% respectively	у.						
PPMcor	werted t	o%:1%i	s equal t	p 10,000	ppm or 1 pp	m is 0.0001%						

#### Mulch/Compost Calculations. Only change in the yellow cells

Nitrogen LBS/ton*	Rate Applied T/Ac	Total N Applied	Availability (T-2)	Availability Application Method (T-3)	Total Available N/Ac	Total N From Last Year	Available from Last Year	Total From 2 Years Ago	Available from 2 Years ago	From Existing SOM**	Total N Available
52.4	5	262	0.4	0,6	62,88	28	4.2	56	2.8		69.88
All the law I will	Description	Station OCh.	- torset							20	

\*From Lab Report \*\* line 36 below

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#### T-2 Availability of Nutrient Based On Time Of Application Before Planting

-	N
1 Month Before	0,5
3 Months Before	0.4
6 Months Before	0.25
1=100%	

#### T-3 Nitrogen Availability Based On Application Method

Method	N
Injected	1
Worked In, Or Rained On Same day	0,8
Worked In, Or Rained On Nextday	0.7
Lefton Surface For More Than 2 Days	0.6

#### Existing Soil Organic Matter (SOM)

Texture	Pounds of N Released Po Acre for Each 1% of SOM				
Loamy Sands & Sandy Loams	40 to 60				
Loams & SiltLoams	15 to 30				
Silty Clay Loams & Clay Loams	10 to 20				

Example: A clay soil with a SOM of 2.5% will release approximately 10 lbs of N for each 1% of SOM or a total of 25 lbs/Ac Use either H7 and J7, or K7, but not both

Source: Sonoma Compost, Will Bakx, 707-664-9113

# Compost in the Field



## Thank you Questions?







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