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Livestock Carcass Composting

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Our Project

- Demonstrate large carcass composting at 7 sites across WA
- Test the WDOE regulations
- Develop simplified guidelines
- Funded by:
  - WDOE
  - WSDA
  - WSU BIOAg Program

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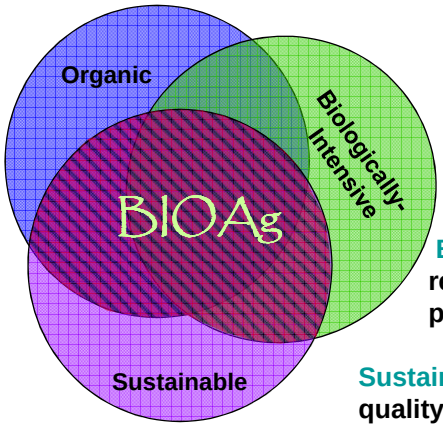
BIOAg = Organic and/or bio-intensive, if it's sustainable.



Organic agriculture: A legally defined and regulated practice that focuses on use of natural materials & non-use of synthetic pesticides, fertilizers, etc.

Biologically Intensive: using renewable biological materials & processes.

Sustainable: Producing high quantity and quality food & fiber with long-term economic, environmental, & social viability.

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Mortality is a Waste Management Issue

- A carcass is a concentrated source of organic matter
  - it is a source of odors
  - it is a source of undesirable critters
  - it is a potential source of pathogens
  - it is a source of nutrients

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Mortality Management Methods

- Incineration
- Composting
- Rendering

$ $ $ $ $ $ $ $

- Chemical treatments
- Open-air decomposition
  - landfill

Bio-safety Odors Scavengers

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Rendering

- ~$200 for site visit + $50 / head
- 2 rendering businesses left in WA, 0 in OR
- Wait 1-14 days between pick-ups

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Composting of Mortality

- Composting is a controlled, natural process in which beneficial organisms reduce and transform organic waste into a predictable and useful end-product
  - a good option for both large and small animals
  - requires some labor and space
  - can be daunting to begin, but usu. easy to continue

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WA Rules

- Most on-farm mortality composting operations are exempt from permitting and metals testing requirements.
- Follow the written guidelines provided
- Provide information to the end-user
- Report annually to the WSDA the number of bovines and equines and the amounts of other material composted

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WA Rules

- Do not accept for composting animal mortalities from other sources not directly affiliated with the composter's operation
- Carcasses to be composted are not known or suspected to be affected with a prion-protein disease such as bovine spongiform encephalopathy, a spore-forming disease such as anthrax or other diseases designated by the state veterinarian
- Apply the compost only to agricultural lands not used for root crops except as prescribed in the guidelines

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Carcass Composting in Oregon

- Must have a composting plan on file with ODA, and be implementing that plan.
  - The plan must include a drawing of your composting area, a description of how you will contain any runoff from the compost piles or bins, a description of the process you will use, and a description of how the compost will be used on the farm.
  - Details of the plan and assistance are available from the Natural Resources Division at the Oregon Department of Agriculture, (503) 986-4700.
- If you are going to compost animal mortalities and byproducts and intend to bring in animal mortality and byproducts from off-farm sites you will need a composting permit from the DEQ.

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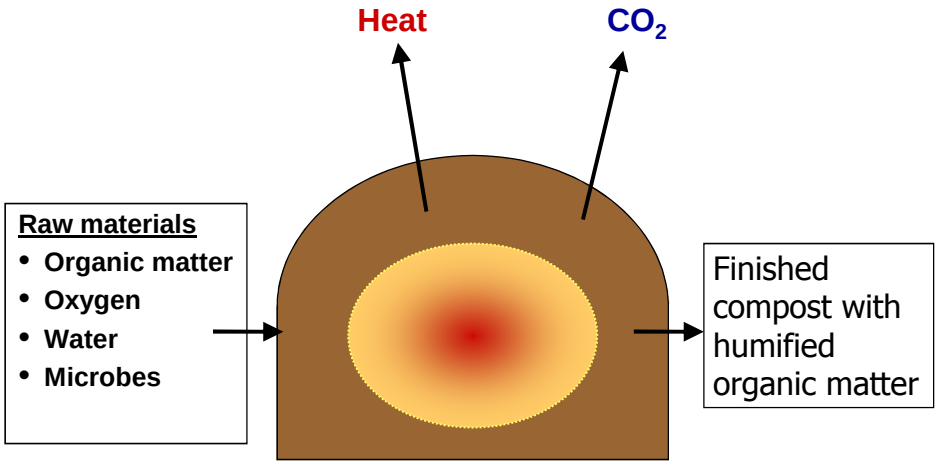
What is composting?

- Microbial decomposition of organics, *en masse*
  - transformation of raw materials
    - Biologically, chemically, physically
- Cost-effective, environmentally sound, biosecure
- Relatively easy without odors or attracting scavengers

Composting is a biological process wherein organic raw materials or "feedstocks" are transformed by organism activities into a stabilized soil-like material called compost.



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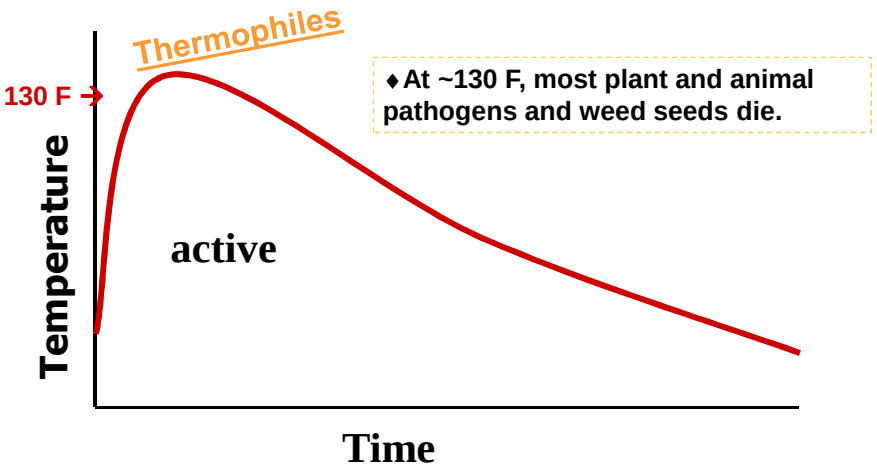
Compost Temperature

- Tremendous microbial activity produces heat.



- At ~130 F, most plant and animal pathogens and weed seeds die.

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Create a Composting Environment

Factor	OK range	Optimum
C:N	20:1 – 50:1	25-30:1
Moisture	40 – 65%	50 – 60%
Oxygen	>5%	>>5%
pH	5.5 – 9.0	6.5 – 8
Particle size	1/8 – ½”	varies

Carbon-Nitrogen (C:N) ratios of some common materials

Material	C:N ratio
Animal carcass	5:1
Soil humus	10:1
Young legumes	12 - 20:1
Young grasses	20 - 40:1
Manure	20 - 50:1
Corn stalks	60:1
Wheat straw	80:1
Tree leaves	60 - 100:1
Pine needles	200 - 250:1
Wood	400:1

Narrow or low C:N

Energy materials

Balanced materials

Bulking materials

Wide or high C:N

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Mortality Management

- Daily losses
  - Plan
  - Structure
    - 1 lb carcass = 2 ft^3 space needed
- Catastrophic losses
  - Plan

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Mortality Rates

Swine

Growth	Average Weight, lbs	Mortality Rate,%			Design Weight, lbs
		Low	Average	High	
Birth to Weaning	6	< 10	10-12	> 12	10
Nursery	24	< 2	2-4	> 4	35
Growing-Finishing	140	< 2	2-4	> 4	210
Breeding Herd	350	< 2	2-5	> 5	350

Cattle/Horses

Growth Stage	Average Weight, lbs	Mortality Rate,%			Design Weight, lbs
		Low	Average	High	
Birth	70-130	< 8	8-10	> 10	130
Weanling	600	< 2	2-3	> 3	600
Yearling	900	< 1	1	> 1	900
Mature	1,400	< 0.5	0.5-1	> 1	1,400

LPES 51, Appendix C

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Planning for the Impossible...

- Natural disasters can and do happen
  - Flooding (IA, 1993 & NC, 2000)
  - Heat Waves (CA, 2005)
  - Snow (Blizzard of 1993)
    - millions of broilers and chicks lost to building collapse and loss of power for heating
  - Whole herds may be destroyed


Planning for the "impossible"
Hurricane Floyd 1999
SE North Carolina


Responding to tragedy

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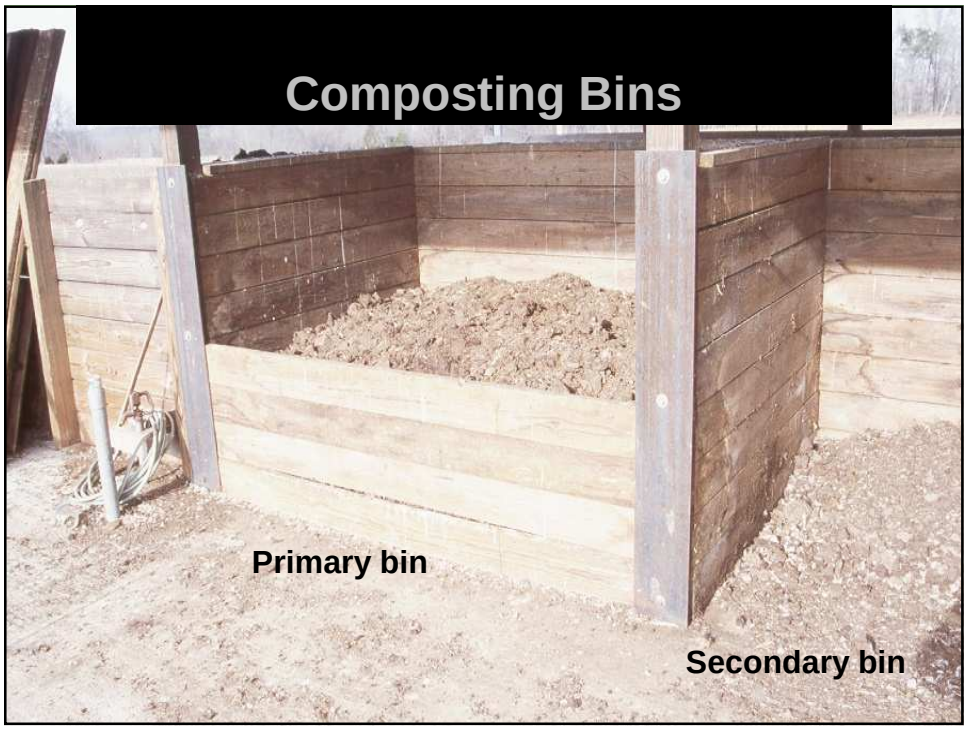
Mechanical Composter

Composting Bins



4-bin large mortality composter - Iowa

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Composting Bins for Mortality Disposal

- Volume is based on poundage of daily losses
  - if average 200 pounds of loss per day
    - then need 200 cubic feet of primary is recommended + 200 cubic feet of secondary
- Width and depth depends on equipment
  - must be wider than your front-end loader
    - typically 8-feet wide

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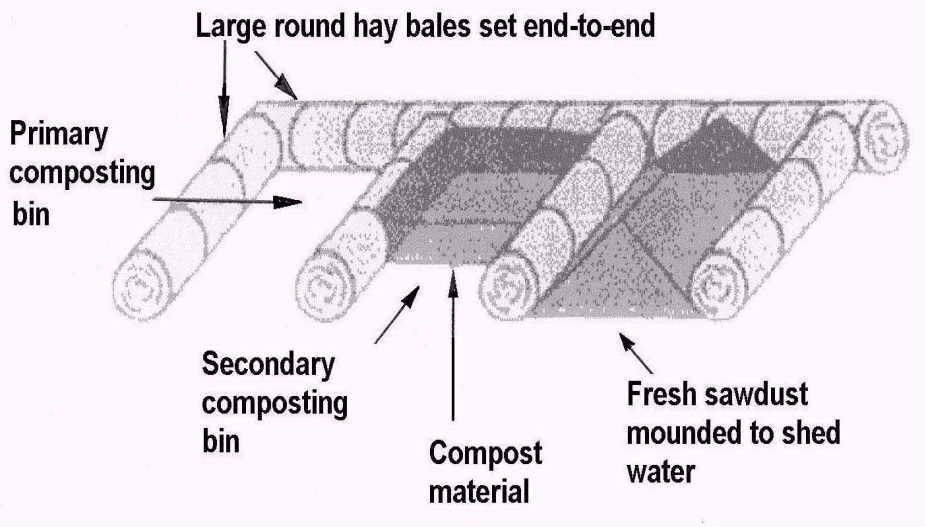

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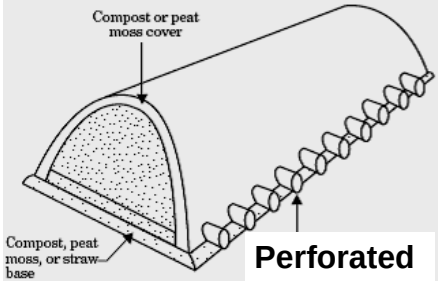
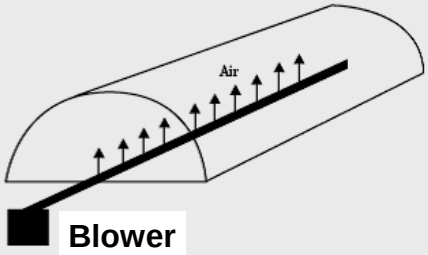
Aerated Windrow Composting

Passive aerated windrow



Perforated pipe

Active aerated windrow



Blower

NRCS National Engineering Handbook Part 637 -Chapter 2 Composting

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Passive Piles or Windrows

Place the carcass on >24" high-carbon base to absorb moisture & allow airflow

•Wood shavings, straw

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Cover the Carcass, Build the Pile

Minimum 24" co-composting material (Dewatered dairy waste, manure, feed refusals) around the carcass to help decompose, discourage critters, and allow airflow

Concave to collect water, or convex to shed water.

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Optional – cover layer

Tarps, straw, sawdust can be used to shed water.

Topped off with a layer of separated dairy solids to control odor and flies

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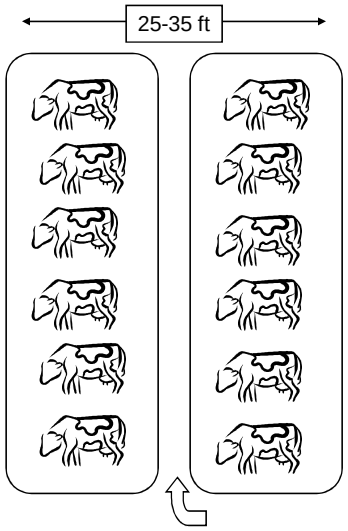
Source; T. Glanville, ABE

Pile temperature must reach 131 F.

4. More carcasses may be added to one side to form a windrow.

Windrow Layout for Large Animal Mortality Composting



- ✓ Windrows should run up and down the slope to allow for best drainage.
- ✓Do not drive over the materials. Compaction will restrict Oxygen availability in the pile.
- ✓Add each mortality to the pile as they occur and note the date and location.
- ✓Calves can be stacked together, or placed with a cow.

20 ft to the next set
(or enough space to maneuver loader)

ON-FARM MORTALITY COMPOSTING RESEARCH AND EDUCATION PROJECT
www.mortcompost.info

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WAIT -- Composting takes time

- **An active pile stays hot. This pile was 135-152 F through December.**

- **Wait ~2-6 months before disturbing the pile**

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Typically only large bones are left identifiable after 2-6 months. Re-compost these quickly.

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Allow 1-2 more composting periods

- **Temperature will rise again, but not as hot.**

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For more info…

www.mortcompost.info

WSU BIOAg Program

- **An *integrated* research, outreach, and education program**