Can catastrophic turkey mortalities be composted in-house as a means of disposal?

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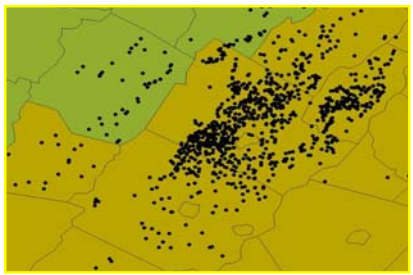
- Cargill provided the turkeys needed for the project.

Density and Concentration of Production Complex in the Shenandoah Valley



Broilers / Broiler Breeders / Turkeys / Turkey Breeders[3]

Experience of Avian Influenza 2002

- 197 farms affected and depopulated
- 79% were turkey farms
- 4.7 million birds depopulated
- $7.25 million for turkey disposal
- Cost of disposal per farm = $30,175
- Disposal cost per pound ~ 7.2 cents
- Cost of disposal per ton = $145
- Cost of tipping fees per ton = $75

Down Time for Poultry Houses in 2002

- Average of 74 days
- Average of 10 ½ weeks
- Lowest number of days = 25
- Highest number of days = 177

Methods of Disposal Utilized in 2002 Avian Influenza Outbreak	Number of Birds	Percent of Total
Composting (Ag-Bag & In-House)	43,000	0.9
Incineration	641,000	13.4
Landfilling	3,103,000	65.5
Slaughter	943,000	19.9
On-Site Burial	15,000	0.3
Total	4,732,000	100

Benefits of in-house composting

- Limits the risks of groundwater and air pollution
- Limits high fuel costs
- Limits the potential for farm-to-farm disease transmission
- Limits transportation costs
- Limits tipping fees
- An organic soil and nutrient amendment

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Research and Demonstration Objectives

- To test in-house composting as a method of disposal and disease containment.
- To test how quickly the in-house process could be completed.
- To test the effectiveness of carbon sources and rates.
- To compare the effectiveness of composting whole carcasses, shredded and tilled carcasses, and crushed carcasses.

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How to get from this point …

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…to this point as quickly as possible?

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Treatments and Variables

- Carbon Materials Used
  - Hardwood Sawdust
  - Woodchips
  - Built-up Litter
  - Starter Litter
  - Blend of starter litter and built-up litter
- Birds
  - Whole birds mixed and piled
  - Shredded birds mixed and piled
  - Crushed birds mixed and piled

Turkey carcasses were heavy hens and toms ranging in weight from 17 to 40 pounds.

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What the base should like before starting the windrows?

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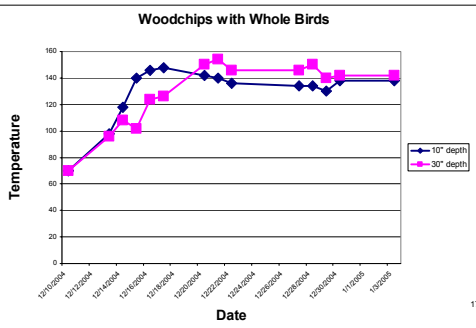
Whole birds mixed with sawdust

Tilling and shredding the birds

Capping the Sawdust windrow

Compost Fleece

Temperature Monitoring



Aerating the Windrow

Whole birds with Built-up Litter after 13 Days

Approximate litter needed to compost different bird types

Bird type	Age (weeks)	Weight (lbs.)	# of meat/ sq. ft	Depth of litter (in.)
Starter hens	5	3.5	3.87	4
Heavy hens	16	22	11.92	10
Heavy toms	20	40	12.50	10

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Treatments for Minimum Carbon Material Needed for Base and Cap

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Density on a Square Foot Basis

Whole Birds

Crushed Birds

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Minimum Carbon Material for Whole Birds

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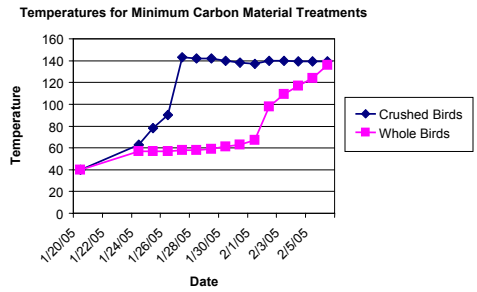
Temperature and Time Comparison



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A "Typical Farm" in 2002

- 45,600 birds
- 22,800 – 14 week old hens, Avg. body Wt. 16 lbs.
- 22,800 – 4 week old hens, Avg. body Wt. 3 lbs.
- 352,000 pounds + 66,000 pounds = 418,000 pounds or 209 tons
- 14 Semi truck loads.

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Cost estimates for In-House Composting after Euthanasia

- 2 skid loaders ~ $140 per house
- 2 skid loader operators ~ $180 per house
- 1 person knowledgeable of composting ~ $150 per house
- 1 laborer ~ $60 per house including disinfecting skid loaders
- 5 to 6 hours of operation per house including crushing the carcasses
- 1 hour to clean and disinfect the skid loaders

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Cost estimates if No Additional Carbon is Needed to Compost

- ~ $530 per house/ 104.5 tons of carcass per house = $5.07 per ton (if no additional carbon material is needed)
- ~ $700 for one 200' roll of reusable compost fleece per house

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Cost estimates if Additional Carbon is Needed to Compost

- ~ $1000 per house for hardwood sawdust
- ~ $530 per house for labor and equipment
- 104.5 tons of carcass per house
- $14.64 per ton (if additional carbon material is needed)
- ~ $700 for one 200' roll of reusable compost fleece per house

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Cost of Landfill Disposal

- **Trucks $7,000**
- **Pay loader $ 1,200**
- **Man hours $1,000**
- **Landfill fees $ 15,675**
- **Misc. Supplies $300**
- **Skid Loaders $400**

And you still have transportation and litter handling costs!

Total Cost / Farm $25,575

Cost $122 per ton

Preliminary Findings for Minimum Carbon Material

- Temperatures of 140+ degrees were achieved within 5 days for the crushed treatment or 11 days quicker than the whole bird treatment.
- With a 5 inch base layer and 5 inch cap (10" total), no seepage occurred at a density of 12.5 pounds per square foot and composting was promoted.
- Without crushing the birds, the whole birds tended to roll off the pile and take longer to begin composting.
- In the whole bird treatment, at least 1" of carbon material per pound of carcass was needed to adequately cover the carcass. More material was needed to promote composting.

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Results

- Very little remained of the carcasses after two weeks and even less after being turned twice.
- Temperatures reached and maintained temperatures of at least 130 degrees for 5 days
- All four carbon materials were effective in composting (e.g., woodchips and sawdust).
- Tilling increased the decomposition process by 3 days.
- Crushing increased temperatures and the decomposition process by ~ 11 days.

Conclusions

- With a good base, cap, and proper disease monitoring, the compost could be turned and moved to a litter storage shed or stored under a compost fleece within 3 to 4 weeks.
- In the worst case scenario, where there is very little base litter (i.e., < 5") and large heavy toms (i.e., ~ 40#), two tractor trailer loads of carbon material per house (i.e., 20,000ft^2) may be needed to promote composting.
- However, 7 semi trailer loads were needed to haul carcasses from a typical house in 2002.
- In-house composting, after the euthanasia crew is done, would require 2 skid load operators, 1 individual with composting experience, and 1 laborer.

Action Items and Additional Research

- Identify suitable compost sites for final composting and curing.
- Identify which types of farms (i.e., broiler breeder, turkey breeder, and double deck houses) that may need to compost outside.
- Identify and secure several sources of carbon materials.
- Encourage integrators to designate a team to be trained to manage in house composting in an outbreak or catastrophic loss.

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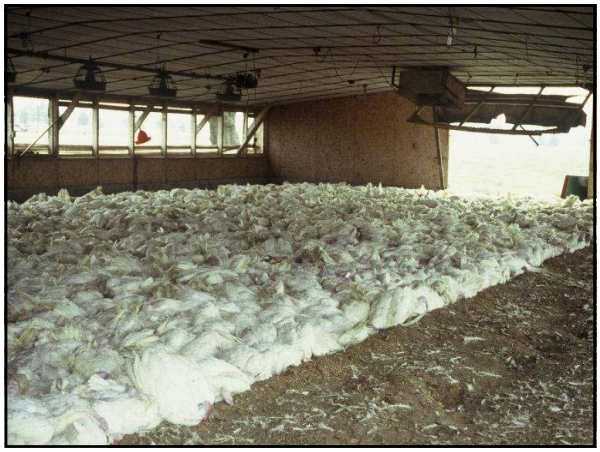
Thank you very much!

Key Objectives in a Disease Outbreak

- Keep the process simple.
- Handle the compost as little as necessary.
- Use as much on farm equipment as available and appropriate.
- Limit the amount of material brought onto the farm.
- Limit the amount of equipment used to reduce the need for cleaning and disinfecting.
- Adhere to appropriate biosecurity protocol.



Steps from Euthanasia to Composting

- Decide on area for euthanasia pen
  - Will you compost young birds in starter house or grow out end?
  - Will you need additional carbon material?
  - Where can you unload and store the carbon material?
- Try to keep entrance ways clear and accessible for skidloaders

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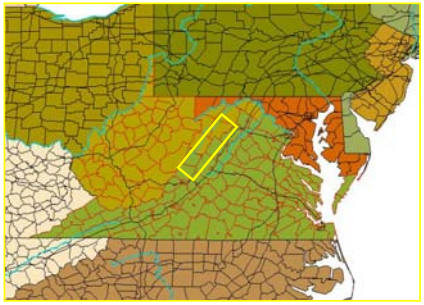
Poultry Industry in the Shenandoah Valley



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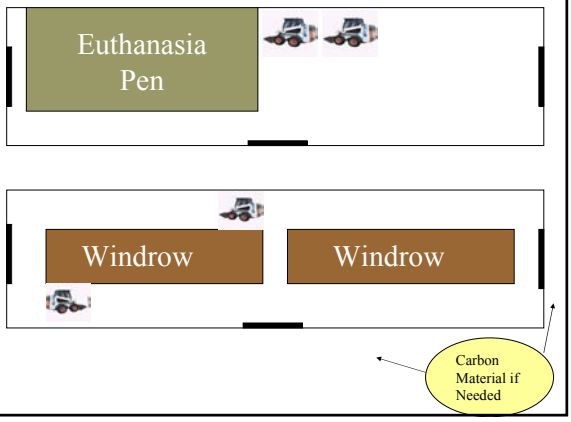

Additional Considerations for In-House Composting

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