Managing Mass Mortality in HPAI Outbreaks

Presented by
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History of Composting Mass Mortality In Avian Flu Outbreaks

- 1984-Va outbreak-Burial was the carcass disposal method

- 2002-Va-Low Pathogenic Avian Flu(LPAI)
    1. first flock was buried-public outcry eliminated that option
    2. off-site incineration was tried-too expensive and became a odor issue
    3. one farm turkey- in-house composting- birds and manure piled in center of house birds mummified and did not compost properly
    4. two farms with Ag Bag composting (one chicken egg layer and one turkey) carcasses separated out of the mix when loading the bags
    5. landfilling was primary carcass disposal method

History continued

- 2002-Va- off-site disposal methods may have contributed to spread of LPAI- almost 200 farms were depopulated

- 2004- Delmarva Peninsula- 3 broiler farms composted in-house
  -did not spread beyond those farms

- 2005-demonstration in Va of in-house composting market age turkeys (40-45lbs)

History continued

- 2007- WVa and Va -first in-house composting of turkeys during a LPAI outbreak on 2 farms

- 2015 –Minnesota, Iowa, Wisconsin,Nebraska-HPAI outbreak
  in-house composting- turkey and turkey breeders
  primary method-over 150 farms
  composting in outside windrows at layer farms

History continued

- 2016- Indiana- turkeys-outside temperatures below zero F

- 2022- present –nationwide outbreak
  - wide range of species (including ducks, pheasants, and peacocks)
  -composting primary carcass disposal method, but burial used in several states

Subject Matter Experts (SME)

- 2015-2016 USDA contacted composting experts to supervise the composting process during the HPAI outbreak
- Fall of 2015 –this group of experts developed the USDA mass mortality protocol for in-house composting and outside windrows
- 2017- Composting SME LLC contracted with USDA to deploy trained and certified SMEs during future HPAI outbreaks

Subject Matter Expert(SME)

- 2018 - SMEs deployed by the North Carolina Department of Agriculture to oversee composting of flooded poultry houses (non-disease)

- 2018 to present-Maine Compost School trains SMEs in 3 day school either in Maine or in regional training sites

- Full SME certification – completion of training and 14 day deployment during an outbreak with a SME

Subject Matter Expert (SME)

- Many State Department of Agriculture/Environmental and USDA-APHIS staff have been trained and deployed during the 2022 outbreak to the present

- SMEs responsibilities
  - assure that the composting contractors meet the USDA protocol for windrow construction and time /temperature (131 degrees for 3 consecutive days during each 14 day composting period)
  - farm is responsible for complying with state environmental permits

Initial Farm Assessment

Confirm Flock Information

- Species of bird
- Type of bird (layer, breeder, growout, etc.)
- Average weight per bird
- Number of houses
- Number of birds per house

Facility Information

- Size of each poultry house
- Access to farm
- Staging areas for carbon
- Location of poultry house doors
- Outside composting site (if needed)
- Compost storage site (after 28 days)
- Vehicle C&D site

Environmental Considerations(berming)


913
136
Swope Rd

Manure Evaluation

- Type of manure (with or without bedding)
- Depth of litter in each building
- Manure Characteristics
  - Age
  - Moisture
  - Bedding material
  - Consistency
  - Amount of caked material

Additional Material for Composting

- Litter in storage
- Feed and feed ingredients on the farm
- Eggs and egg products
- Paper products (cage liners, egg cartons, etc.)
- Routine mortality compost

Calculating Carbon Needs

Calculating Carbon Needs

- Total weight of each nitrogen source
  - birds
  - raw manure with no bedding
  - Eggs
  - feed
- Calculate total carbon needs
  - Multiply total weight of all nitrogen sources by 1.5

Calculating Carbon Needs

- Calculate carbon from litter in poultry houses
- Calculate carbon deficit
  - Subtract total weight of litter from total carbon needs

Calculating Carbon Needs

- If there is a carbon deficit, calculate other on-farm carbon resources:
  - Litter in storage
  - Shavings or other bedding
  - Silage
  - Corn stover
  - Wood chips
  - Bedpack manure
  - Routine mortality compost

Calculating Carbon Needs

- Calculating off-site carbon needs
  - Subtract total on-farm carbon sources from total carbon need
- Order carbon deficit

Calculator for Windrow Composting of Mass Poultry Mortality

Site code:	Example 2	Date:	April 18, 2017	Developer:	J. Doe

Poultry Houses and Poultry Information

House Number	House Length	House Width	Litter Depth (ft.) (average)	Bird Type	Bird Weight (average per bird)	Bird Number (per house)
1	600	42	0.25	Turkey - Meat Tom	28	14,000
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						

Carcass Nitrogen Source

Total carcass weight (lbs)
392,000

Additional Nitrogen Sources

N Source 1	Amount (lbs)	N Source 2	Amount (lbs)	N Source 3	Amount (lbs)	Total additional Nitrogen sources (lbs)
Manure only (no bedding)		Eggs		Feed	12,000	12,000

Carbon Required for Compost Windrows

Carbon factor	Carbon (lb)
1.5	606,000

Carbon Available *Litter In Houses*

Litter Category	Avg. litter depth (ft)	Litter Bulk Density (lb/ft^3)	Litter available (lb)	Litter available (ft^3)	Litter available (yd^3)
Carbon source	0.25	25	157,500	6,300	233

Carbon Available On-Farm *Stored Litter/Compost*

Stored Carbon Source 1	Amount (yd^3)	Litter Bulk Density (lb/ft^3)	Stored Carbon Source 2	Amount (yd^3)	Compost Bulk Density (lb/ft^3)	Stored Litter and Compost (lb)
Litter		30	Compost	6	25	4,050

Additional Carbon Needed

Additional Carbon Needed (lb)	Carbon Type	Bulk Density	Additional Carbon Needed (ton)	Additional Carbon Needed (ft^3)	Additional Carbon Needed (yd^3)
444,450	woodchips	25	222	17,778	658

House Construction Consideration


Free Span House


Pole Support


Turkey Breeder


Broiler Breeders

Broiler breeders

Preparing Houses for Windrow Construction

- Raise feed lines
- Raise water lines
- Empty feed from pans and tanks
- Raise or remove heaters
- Other equipment
- Secure loose cables, hoses, etc.
- Evaluate overhead lines outside the buildings

Windrow Construction Principles

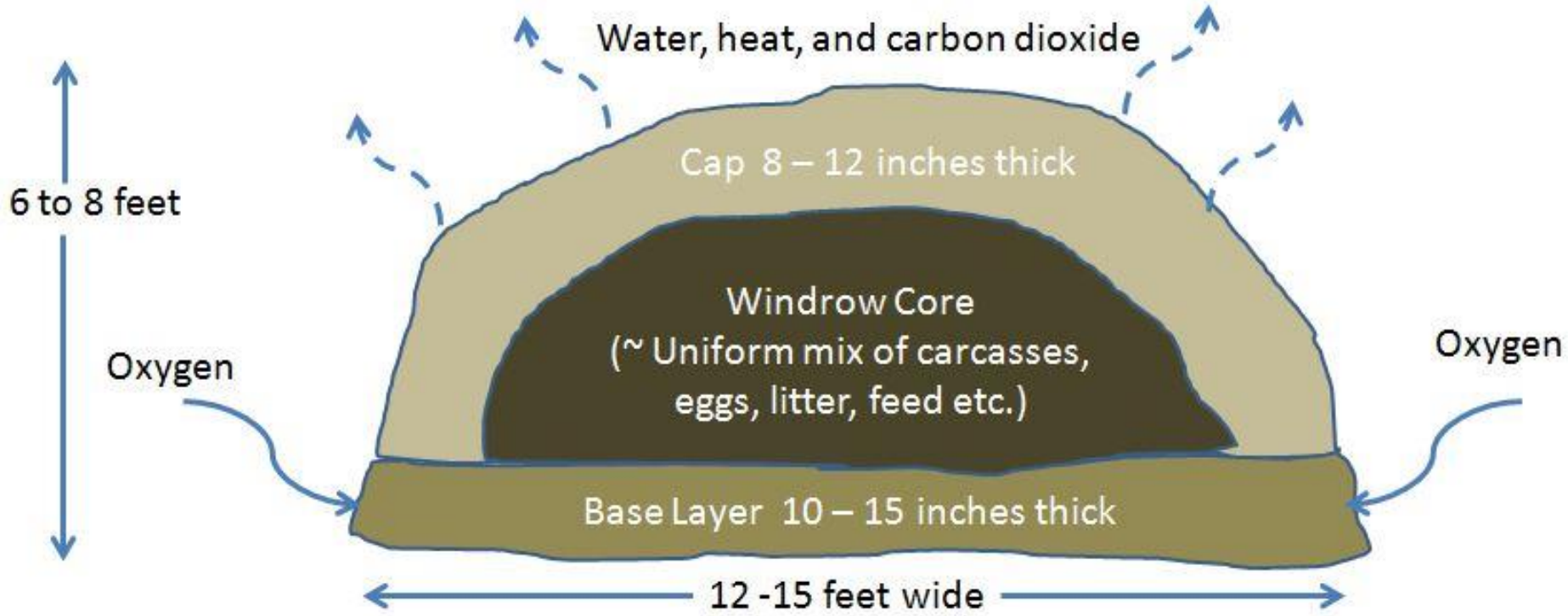


Figure 1. Cross Section of Compost Windrow

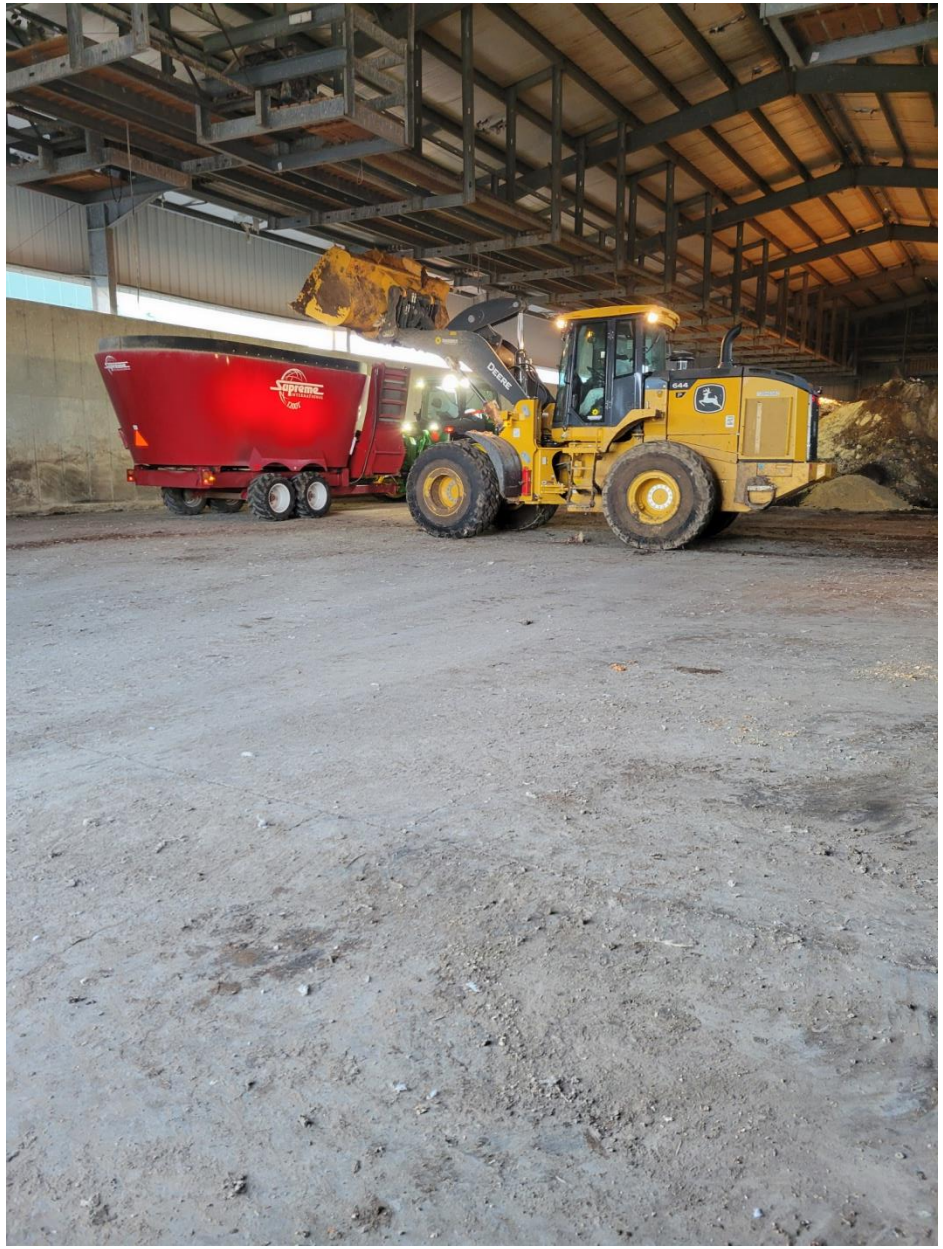

DEERE


Cage Layers

Outside Composting

- Prevailing winds
- Slope
- Depth to groundwater
- Depth to bedrock
- Flood plain
- Surface water
- Wells
- Residences
- Drainage tiles

Composting Plan


DEERE
644

Area needed for outside composting

- Example:

- 4 million 3.5 lb birds
- 18 foot wide windrows – 8 feet tall
- 90 windrows average 500 feet
- 8.5 miles
- 90-100 acres

Volume of additional carbon needed

- Example
- 4 million birds
- 1300 tractor trailer loads @ 100 cubic yards per load
- Need cold zone unloading area to eliminate need for C & D of carbon trucks- loaders can push carbon into hot zone

Adding moisture to dry layer manure

- Add water when mixing carcasses ,manure and feed on outside pads
  -construct “volcanoes” (berms may be needed to control runoff)
- Add water in manure shed while mixing
- Add water to outside windrows prior to capping (not as effective)
- Add water in manure pits with drip irrigation tape prior to removing manure and carcasses from house (preferable if houses have manure pits)

Composting in the Manure Pits

Composting in Manure Building

Managing Eggs and Egg Products

- Need to know from the beginning –difficult to manage these products after windrows have been constructed
- Build “volcanoes” of carbon in manure shed to mix
- Build two sided dam in corner of shed to mix


Use of Compost Fleece

Most recent news with Dairy Herds

- Dairy Herds in Texas infected with HPAI from migratory birds
- No mortality but drop in feed consumption and milk production over a 2 week period (milk becomes viscous-has to be disposed)
- One worker at a dairy in Texas contracted HPAI –primary symptom was conjunctivitis (pinkeye)
- Recent outbreak of HPAI in Michigan in egg layers and turkeys
  - infected cattle from Texas hauled to dairy in Michigan-workers from the dairy and nearby egg layer farm lived together
  - infected birds from first farm hauled to landfill by a turkey farm may have infected the turkey farm

Most recent outbreak

- 3 egg layer farms and one turkey farm in Michigan
- one egg layer farm in Texas may have contracted HPAI from a nearby infected dairy herd
- Not known at this time if beef herds have been infected

QUESTIONS?

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