

# Bedding Alternatives and Options

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## Outline of Presentation

1. Bedding issues facing US poultry industry
2. Management options with bedding shortages
3. Alternative bedding materials
4. Option to extend litter life

## NCC Bedding Survey

- ❖ Regional shortages from Mid-Atlantic to Southeast to South
- ❖ Short- and Long-term issues influencing shortages
- ❖ Expect situation only to get worse!
  - Decrease availability
  - Higher cost
  - Poor quality

## Periodic Shortages Due To:

- ❖ Seasonal demand by poultry
- ❖ Housing market
- ❖ Temporary disruption of supplies
  - Weather
  - Mill repairs



## Long-Term Bedding Issues!

- ❖ Milling technology
- ❖ Trade issues and markets for loblolly pine
- ❖ Competing uses:
  - Particle board
  - Energy for mills, industry and homes
  - Carrier for pesticide (peanut hulls)



## Regional Bedding Issues!

- ❖ Changing land ownership (urbanization, conservation groups, land use, land prices)
- ❖ Energy
- ❖ Horses
- ❖ Landscape/horticulture
- ❖ **Plus on DMV high timber prices and limited supply to support existing mills=**

## Delmarva Mill Closures



- ❖ Closure of 4 of 8 mills past 5 years
- ❖ Loss 70% of pine milling capacity

## Regional Projections

- ❖ Slight increase in pine harvest on Delmarva but not mill output (more efficient milling)
- ❖ Expect continued competing uses but balance offset by new industry or closure of existing industries (ie. pulpwood/chips)
- ❖ Bedding supply issues/opportunities by state:
  - MD: stable to slight decrease
  - DE: decrease
  - PA & WV: slight increase in residues if export market develops
  - NJ: potential source of pine fiber if reprocessed into bedding

Dan Rider, MD DNR

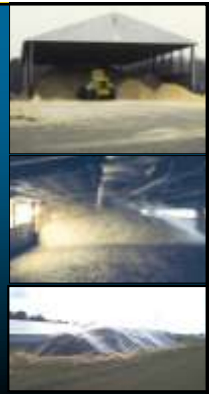
## Managing With Shortages

- ❖ Reduce frequency of cleanouts (ventilation, drinker management, litter amendments and health programs help, BUT
- ❖ Consequences:
  - Caused mills to seek alternative markets
  - Decreased performance and health



## Managing With Shortages

- ❖ Stockpile for peak usage (higher cost, fire risk)
- ❖ Reduce placement depth (need dry bedding; good house/litter/crusting management)
- ❖ Import from other states (cost-effective materials and transportation)
- ❖ On-farm storage to offset scheduling issues and cost issues



## Managing With Shortages

- ❖ Re-process chips and residues into bedding material (quality???)



## Managing With Shortages

- ❖ Long-term investment into shavings mill or re-process wood chips into sawdust-like material to supplement supply



# Alternative Bedding Materials

*Quality Pine Shavings/Sawdust is the Premier Bedding !!!*



## Supplement with Hardwood



Poplar Sawdust

- ❖ Some use dry or treated hardwood (green oak ??)
- ❖ Poplar = health/mold to pine and less litter cake/foot pad lesions than poor quality pine (UD study funded by USDA, FS)

## Other Wood Products - Limited Success

- ❖ Chips
- ❖ Pine straw
- ❖ Bark
- ❖ Leaves
- ❖ Wood pellets
- ❖ Ground pallets
- ❖ Paper mill residues

## Composted Land Clearing/ Poultry/Ag Waste

- ❖ Local supply and cost effective?
- ❖ Preliminary research suggest worthy to proceed to larger trial.



## Composted /Recycled Horse Bedding



Terra Gro, Peach Bottom, PA

- ❖ Local supply and cost effective?
- ❖ Screened shavings used for dairy but not tested for poultry

## Plant Products

- ❖ Hulls (rice, **peanut**, **coca**/coffee bean, cottonseed, sunflower, soybean, oat, wheat)
- ❖ Straw/stalks (**wheat**, barley, rye, oat, flax, soybean, corn, corn cob, kenaf core, switch grass, Bermuda grass, citrus pulp, sugar cane bagasse)

## Coca Bean/Peanut Hulls



- ❖ Opportunity to use limited to few areas
- ❖ Low moisture (7-8%), can be dusty
- ❖ Peanut hulls difficult to spread, higher ammonia and storage issues???

## Wheat Straw



- ❖ Limited use in broilers and turkeys in US
- ❖ Often available at competitive cost
- ❖ Must chopped <1 inch
- ❖ Difficult to manage, best used as topping or mixed with other bedding
- ❖ 40,000 lbs per 20,000 ft<sup>2</sup> house (turkey growout)
- ❖ Need equipment to blow into house & spread with tractor rake
- ❖ Best if exposed to rain one time, avoid wet straw
- ❖ Clean-out difficult



May Require Alternative Material Handling Equipment



Coordination and timely baling critical!!!

## Earth Products

- ❖ Sand
- ❖ Clay
- ❖ Peat moss

## Growing Broilers on Sand



- ❖ Beach sand used in 1920's on Delmarva
- ❖ Used in areas deficient of bedding materials
- ❖ Renewed interest – extended litter reuse/alternative market for litter
- ❖ Research + field trials in MD, AL, NC, AR, GA



## Masonry-grade sand from local plants??



## Sand

### Advantages

- ❖ Less beetles
- ❖ Potential alternative-use markets
- ❖ Cost-effective IF local

### Disadvantages

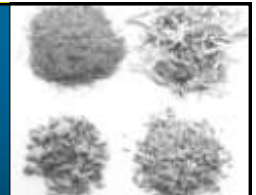
- ❖ High moisture, must dry out
- ❖ Initially requires more heat (place in warm weather, use radiant heaters)
- ❖ May limit some end uses
- ❖ Higher dust and ammonia?

## Recycled Products

- ❖ Newspaper/cardboard (shredded, processed, pelletized)
- ❖ Composted municipal garbage
- ❖ Plastics
- ❖ Foam (polystyrene, urethane)
- ❖ Recycled sheetrock
- ❖ Shredded tires

## Paper-Base Products

- ❖ Some shredded paper being used, cut better than shred, best as topping
- ❖ Some pelleted paper (AL) and cardboard (NC/SC) being used, limited supply, hard pellets works well
- ❖ Ground sheet rock (NC firm); used as base layer, nutrient management benefits??



(Need local, cheap, consistent quality and compatible material handling)

## Envirobed Bedding Study (Hulet, PSU)



- ❖ Chipped cardboard tubes, dust/fines removed and baled
- ❖ Compared to shavings, broiler performance same, lower moisture and better water absorption.

## Alternatives to Cleanout Why Do You Cleanout?

## Cut Centers to Manage Litter Depth



- Reduce heat stress
- Reduce depth to avoid equipment damage
- More even distribution of litter for nutrient management plan

## Cleanout to:

- ❖ Maintain optimum performance/cost
- ❖ Reduce challenges due to disease and stressors (i.e. ammonia)

## In-House "Composting" as a Means of Reducing Pathogens and Extend Litter Life

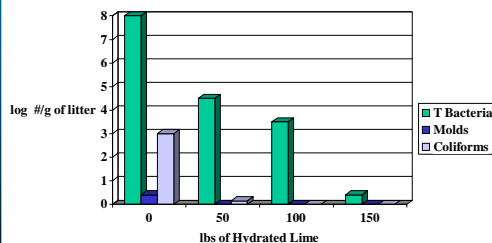


## Cooper Hatchery Litter Sanitation

- ❖ Cake removed, apply lime (50-150 #/1000 ft<sup>2</sup>), till, stockpile (4' high) for 3 days
- ❖ Spread and let dry
- ❖ Reduce litter bacteria, ammonia and odor

Poultry Sci. 1987

Effect of Hydrated Lime on Litter Microflora



## UD Preliminary Study (~1990)

- ❖ 4-flock litter piled (4') for 3 days
- ❖ Treatments = pine sawdust, used litter, used litter with Phos Acid, stacked litter, stacked litter with Phos Acid
- ❖ Reared in chambers to 14 days, afterwards grown on used litter

Parameter	Age (d)	Pine SD	Used Litter	Used + PA	Stack Litter	Stack + PA
NH <sub>3</sub> (ppm)	1-14	15	39	14	34	10
BT (10 <sup>7</sup> )	1	1	112	---	4	.5
Body Wt. (lbs)	14	.51	.53	---	.55	.56
Body Wt. (lbs)	41	3.71	3.76	3.81	3.82	3.93



***In-House Composting/Pasteurization/BHT***

- Reduce pathogens, beetles, ammonia, crusting.
- Improves performance???
- Recondition/dry litter/extend life.
- Used by commercially and by organic producers

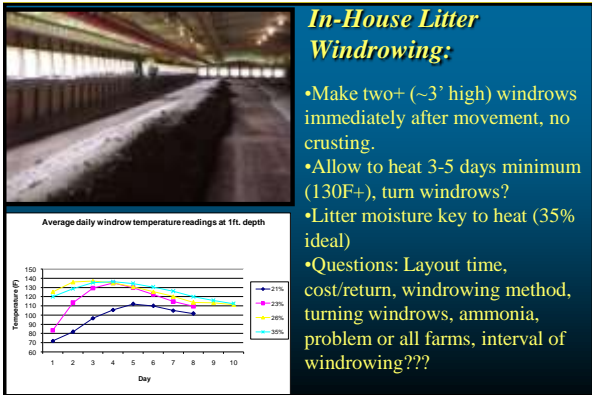
***Pathogen Reduction (UD, AU, LSU)***

- ❖ Causes thermal, chemical and biological kill.
- ❖ Eliminates: Coliforms, Salmonella, LT
- ❖ Reduces: Clostridium Perfringens (~50%), Total Aerobic Bacteria (~10-30%), Anaerobic Bacteria (~60-80%)



***In-House Windrowing Challenges***

- ❖ Time required during layout
- ❖ Grower's ability, equipment and desire
- ❖ Cost to build and spread windrows
- ❖ High levels of dust and ammonia
- ❖ "Odor"



## *IL Turkey Grower*

- ❖ Brown Bear equipment used by 3 farms
- ❖ Form 3-4 rows in 40' wide house (deep litter)
- ❖ Set 48 hrs (140-150F), best turn 3 times
- ❖ Advantages:
  - No crusting, reconditions and better quality litter
  - Less ammonia (~50%), fuel and beetles (80%)
  - 24 month pay back (bedding cost)

## *Organic Broiler Operation*

- ❖ Brown Bear equipment used on 80 houses past year
- ❖ Washdown, form 3-4 rows in 50' wide house
- ❖ Up to 3 turns (3 day intervals) with temperatures up to 150 F. Spread and aerate on day 10, place chicks day 12.
- ❖ Advantages:
  - No crusting or bedding replacement, improved bird health, less beetles and ammonia. 12 month pay back (bedding cost)

## *Delmarva Interest in Windrowing*

- ❖ 3 of 4 companies evaluating windrowing
- ❖ Most interest is break disease cycle on problem farms and address bedding shortage/cost.
- ❖ One "may" implement company-wide program.

## *Outlook for Bedding and Alternatives*

1. Expect more re-processed pine products as supplement or blend BUT the poultry industry must make long-term commitments for suppliers to make this investment!
2. May be local sources of wood and paper base products alternatives.
3. Management techniques to reduce pathogens (ie. windrowing) will be implemented to offset frequency of cleanout and bedding demand/cost.
4. Cost of quality bedding will not decrease!