Using Vegetative Buffers to Reduce Environmental Concerns

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Using Vegetative Buffers Is Not New

Industry Trends & Issues

- Move to tunnel/windowless houses & larger farms
- Rural encroachment + conflict/zoning

Emissions

Delmarva stakeholder meeting Dec. 2000 to discuss VB.

Goals of Vegetative Buffer (VB)

1. Visual screen
2. Windbreak + Shade
3. Vegetative filter
4. Biosecurity

Production Benefits

- Reduce snow drifting
- Reduce heating cost
- Reduce cooling cost
- Maintain fan efficiency
- Reduce airborne farm-to-farm disease spread

Influence of Woods on Broiler Production (USPEA Funding)

Microclimate

- Delmarva Wind
- Avg. = 5.5 mph
- Max. = 15 mph

Fan Performance

- Broiler Performance
**VB to Reduce Backpressure on Fans**

- 15 mph wind = 15.5% reduction in fan cfm & 4.4% increase in amperage.
- VB blocks winds and aids in maintaining optimum fan efficiency.

**Reduce Air-Borne Disease Transmission: Roadway and Farm-to-Farm**

- Distance from LT farm not as important as direction of wind from that farm.
- Downwind farms 4 times more likely to get LT.
- N-S oriented houses 40% more likely to get LT than E-W houses.
- Conventional houses 3 1/2 more likely to get LT than tunnel houses.

\[ \text{VB = 16\% less aerobic bacteria aerosols} \]

**Bioaerosol Transfer Between Houses on Same Farm**

- Preliminary results suggest VB reduces aerosol bacteria by ~16%.

**Environmental Benefits**

- Reduce ammonia, dust and odor.
- Reduce runoff.
- Reduce groundwater nitrates.
- Convert CO\textsubscript{2} to O\textsubscript{2}.
- Low cost program to partially address future air quality & emissions challenges.

**Test Site for Measuring Efficacy of Vegetative Buffers**

- Bald cypress 16 ft high.
- Leyland cypress 14 ft high.
- Red cedar 8 ft high.
- Planted March 2002.
**VB Opposite Tunnel Fans “Reduced”**

Wind Speed (99%), Dust (57%), Ammonia (55%) and Odor (27%)

- 2002-2007 data
- 42 sample days
- Better odor dispersion if VB near the source (50’vs200’)

**Effect of VB on Ground Water Quality**

- Six wells sampled spring and fall from 2004 to 2007
- Preliminary data suggest VB reduced nitrates by 20% as groundwater moves from up gradient to down gradient the poultry farm.

**Potential for Carbon Credits and Biomass?**

- Neighbor Relations Benefits:
  - Creates positive image
  - Landscape appearance & increase property value
  - Blocks view of houses, waste facilities and routine farm activities
  - Out-of-Sight-Out-of Mind!!
  - Attractive farms have less odor (Mikesell, et. al., 2001)
  - Reduces odor, dust, feathers, noise, etc.
**Delmarva Neighbor Relations Trends**

- Increasing number of nuisance complaints and more stringent zoning ordinance.
- DPI survey: ~ 40% complaints are dust/feathers, 40% odor & 20% visual, noise, etc.
- Direction and location of tunnel ventilation a major issue.
- DPI developed a proactive industry neighbor policy, VB a major component of the BMPs.

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**Examples of Neighbor Issues**

- Dust From Fans
- Visual Pollution
- Odor From Farm
- Value of New Houses

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**Fragrant Shrubs & Trees to Mask Odor?**

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**VB Implementation Challenges**

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**Design VB For Each Side of Each Farm with a Goal to Meet ALL Objectives – Tree Selection is Critical**

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**Best to Design and Implement Tree Plan BEFORE Building Poultry Houses!**
Form of Plan Material to Use is Important

- Bare root = high mortality
- Containers better option
- Cuttings require care

VB Distance from Fans

- Fan efficiency decreased <4 times fan diameter
- Plume distance 10 times fan diameter
- Plantings near maximum plume distance, add for more fans at each location.

Maintenance and Care Essential

- Insects
- Weed Control
- Irrigation

Limited Information on Planting Trees Between Houses

Potential for VB with Few Years

Summary

- Emission reductions encouraging, continue to better define this program.
- Provides a long-term, low-cost, partial solution to emerging industry issues (maybe one of the most cost-effective BMP’s).
- Neighbor relations has driven interest in VB.
Summary (cont.)

- Growers need technical assistance in designing, implementing and maintenance of VB.
- Cost-share programs available in some states.
- Delmarva poultry industry committed to VB for farms – hired a coordinator to implement this program.