

Odor / VEB Dynamics

Odor

- Ground level emissions
- Limited plume rise
- Spatial & temporal variability
- Particulates & Odor

VEB's (15' +)

- Dilution
- Particulate Interception
- Deposition
- Aesthetics

Single row, 8 yr old Austree Willow Odor Buffer, Winterset, IA

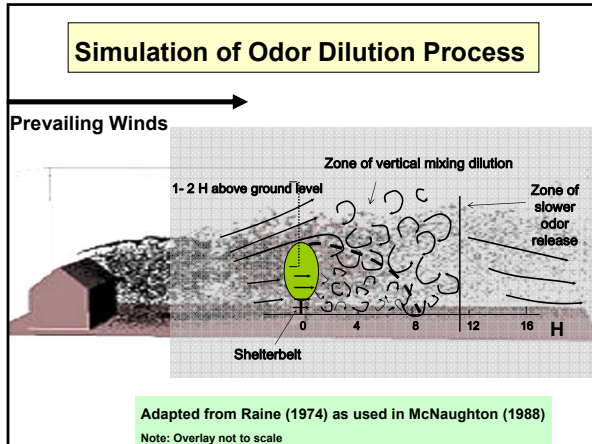
Photo: J. Tyndal

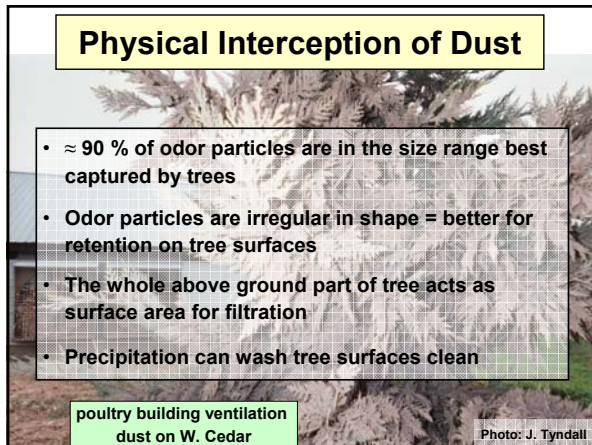
Unabated Odor Plumes (Particulates)

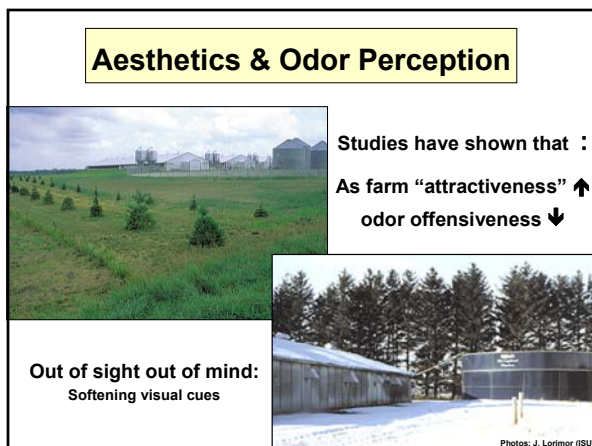
Prevailing winds

Naturally Ventilated Swine Barn

Computer simulation by Lammers et al., 2001







Aesthetic Focus Group Findings:
Iowa Pork Consumers Summer 2004

Iowa:

- High preferences for more trees in Iowa landscape.
- High agreement that shelterbelts improve aesthetics of confinement production.
- High appreciation for “visual” response to odor issues.


Planned Facility Site





Odor Mitigation

- VEB's provide incremental reductions in odor
- "suite" of odor management strategies




**FIDO factor reduction
enhancing the
separation distance**

Photo: G. Wyatt,
U. of Mn. Extension

Other Benefits of VEB's

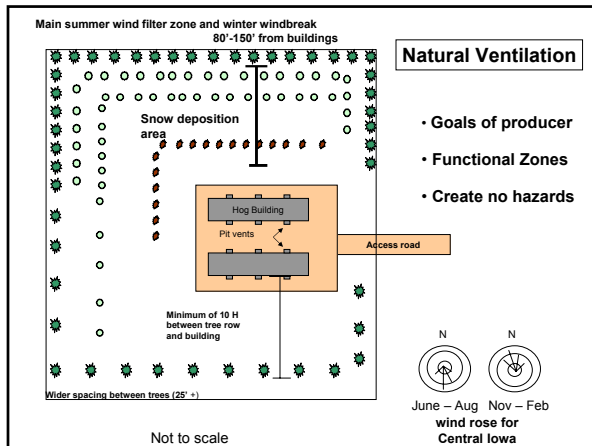
- Size Neutral - Large or small producers
- User Neutral – The public can use VEBs
- Can help with *all* sources of odor
- In theory – increased effectiveness over time
- Comparatively very inexpensive.

Species Neutral



Planting Design Issues





VEB Costs highly variable & site/ design specific.

There are 3 main categories of expenses:

- 1) Site prep costs
- 2) Tree stock & establishment costs
- 3) Long term maintenance costs

VEB Costs


| Species | # trees | Costs | Notes |
|----------------|---------|--------------|-----------------|
| Austree willow | 140 | \$0.70/ tree | 18" cutting |
| Red Cedar | 80 | \$4/ tree | 24" bareroot |
| Red Osier DW | 30 | \$3.50/ tree | 3 - 4 ft Potted |

| | |
|--|---------------------------|
| Upfront costs (Site prep & establishment) | \$740 → 40% of total cost |
| Total costs per pig over 20 yr period | \$0.03/ pig |
| Capital Recovery Costs (Annual cost over 20 yrs) | \$160/ yr |


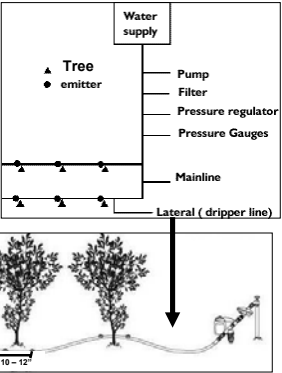
With extensive drip irrigation add ≈ \$0.008/pig

Proper site prep will:

- ↓ Tree Mortality
- ↑ Tree Growth (upwards of 70%)
- Ultimately ↓ time, \$, and effort.
- 1 Yr Before:
 - 4' Kill strip (e.g. Round Up)
 - Disk/cultivate (work soil to 8" depth)
- Yr 1 (Spring – late April/Early May)
 - Disk/ cultivate again & if possible rototill
 - Soil should have no clumps & minimal residue

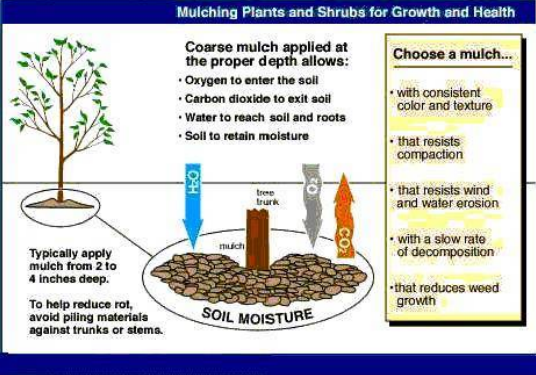


Tree Care Options: Drip Irrigation

Mulching

Mulching Plants and Shrubs for Growth and Health



Coarse mulch applied at the proper depth allows:

- Oxygen to enter the soil
- Carbon dioxide to exit soil
- Water to reach soil and roots
- Soil to retain moisture

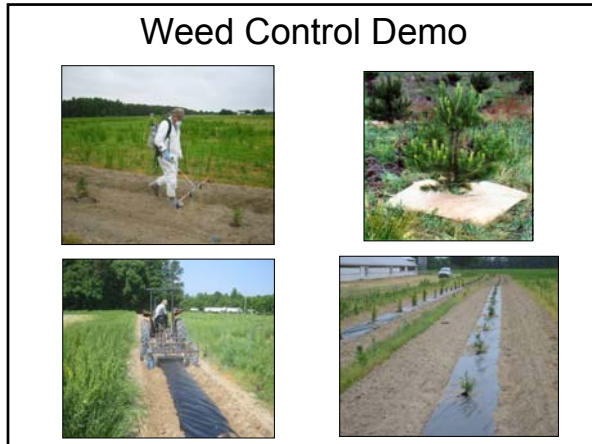
Choose a mulch...

- with consistent color and texture
- that resists compaction
- that resists wind and water erosion
- with a slow rate of decomposition
- that reduces weed growth

Typically apply mulch from 2 to 4 inches deep.


To help reduce rot, avoid piling materials against trunks or stems.

Source: www.hort.cornell.edu



VEB Summary

- Biophysical & Social quantification – “incremental”
 - More research on the way
- Relatively inexpensive – but it is an expense...
 - Cost-share programming important
- Fastest growing application of shelterbelts
- More info becoming available from ISU & others





Slide 22

gm2 Weed control has been one of our major challenges on commercial farms. Evaluating herbicides, weed mat and poly. The weed mat/poly look promising
Bud Malone, 5/5/2005

Thank You for your time!
Are there any questions?

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<http://www.nrem.iastate.edu/research/veb/index.html>