

Environmental and Production Benefits of Trees for Poultry Farms

Planting trees as a visual screen, vegetative filter and windbreak around poultry farms is another opportunity for poultry growers, to demonstrate their continued commitment to voluntarily implement a program to be a good neighbor and environmental steward. The major benefits of trees around the perimeter of houses include:

- * Fosters good neighbor-relations
- * Demonstrates proactive environmental stewardship
- * Increases production efficiency

Fosters Good Neighbor-Relations

Faced with increased urban encroachment on Delmarva, maintaining good relations with neighbors will be a continuing challenge for agriculture. Just the act of planting trees around farms creates a positive image for the poultry industry. As the stand develops, your farm takes on an



attractive landscaped appearance. This aids in creating an aesthically pleasing view, which increases property values, both yours and the neighbors. Over time with the increased height and width of each tree, the view of your poultry operation is reduced. Also obstructed from view are the routine activities, such as feed delivery, live-haul crews and litter cleanout that

sometimes create negative images in the minds of neighbors and the public. The adage “out-of-sight-out-of-mind” may well represent one of the major advantages of providing a visual screen of poultry operations.

Another important aspect of trees is their ability to filter the odor, dust, feathers and noise emitted from poultry operations. With urban encroachment, the likelihood of more odor- and noise-related complaints will increase. This is further exacerbated by the rapid adoption of tunnel ventilation, which concentrates the discharge from houses during summer. With increased ventilation during warm weather and more outdoor activities by the neighbors, summer is often the most sensitive time of year for nuisance-related neighbor complaints. If residential houses are in close proximity and downwind of tunnel exhaust fans, you may well have an explosive issue on your hands.



Trees provide a cost-effective, long-term means of reducing odor, dust, feathers, and noises associated with your daily operations. As shown in the photograph below, trees can be highly effective in scrubbing odor-laden dust particles from exhaust fans.

Leaves, branches and twigs, also help absorb and diffuse noise. Thicker branches and trunks deflect sounds. Tree parts absorb vibrations, thus reducing sound levels in the range of one-half the original volume. Again, noise complaints are becoming more of a concern as we convert to tunnel ventilation and operate the larger fans for prolonged periods of time during warm weather. While planting trees around the perimeter of your farm is not a substitute for good management practices, this natural barrier will reduce nuisance complaints and foster better relationship with your neighbors.

Demonstrates Proactive Environmental Stewardship

Planting trees around poultry farms offers numerous environmental benefits and presents a positive image of agriculture.

Ammonia emissions from poultry houses and its contribution to atmospheric nitrogen and fine particulates may be a major issue facing all animal agriculture in the future. Trees strategically planted on poultry farms may help reduce ammonia emissions by physically capturing both the ammonia gas and the ammonia-laden dust particles.

Early adoption of a tree planting program may be one strategy in helping your operation deal with the ammonia emissions' issue in the coming years.

Another aspect of the trees' ability to cleanse the air is the removal of carbon dioxide, a greenhouse gas. Through the process of photosynthesis, trees clean the air by taking carbon dioxide out of the atmosphere, storing the carbon in their wood and releasing oxygen back into the air. It has been estimated that a single-row evergreen windbreak, one mile long, contains about 1,900 cubic feet of wood, trapping and storing carbon equivalent to 60 tons of carbon dioxide.

In addition to the leaves' ability to capture various gases, the roots of trees are effective in absorbing nutrients that might escape the proximity of the poultry farm. Trees aid in filtering nutrients in the runoff and groundwater. A growing windbreak can take up 200-300 pounds of nitrogen per acre per year from groundwater. More than 80% of nitrogen and phosphorus can be kept from entering adjacent water courses through root absorption or reduction in overland flow.

With continued environmental scrutiny of poultry operations, emissions and nutrient discharge issues will likely increase in the future. Planting trees is another opportunity for you to be proactive in demonstrating your desire to be a good environmental steward.



Increases Production Efficiency

Several years ago, no one would have promoted planting trees around poultry houses for fear of restricting natural air flow to conventional-ventilated facilities. However, as industry shifts toward tunnel ventilation, black-out and windowless-type housing, this is less of a concern.

Overlooked in the past were the potential energy savings of planting trees or windbreaks around houses. Previous research for other applications suggests properly established windbreaks are an energy efficient, natural system, that can reduce heating costs as much as 10%-40% and reduce cooling cost by 20%. Strategically placed, trees provide protection during late fall, winter and early spring by reducing wind speed by more than 50%. A 'wind-shadow' of approximately 200 feet is developed on the downwind side of an established windbreak.



Protecting houses from the wind may minimize structural damages. During summer, trees may offer some degree of roof shading and cooling the air around houses. As shown in the recent tunnel-retrofit photo below, some innovative growers with conventional housing



recognized the benefits of tree roofing shade years ago.

Although this may not be as important for tunnel-ventilated houses, on sunny days, shading the area around houses can reduce the temperature of the ground by 20°F. While actual benefits in reducing intake air temperatures are limited, some preliminary data suggest summer air temperatures next to poultry houses having a shaded (wooded) area on the western exposure, may be up to 7°F cooler in the afternoon than air around houses in an open area.

Properly designed windbreaks can also serve as a 'living' snow fence. A tree windbreak can capture up to 12 times more snow per foot of height than a picket fence, and they are 90% cheaper.

Another potential benefit of trees surrounding the poultry farm may be improved biosecurity. By restricting air-borne particulates trees may aid in blocking air-borne poultry diseases from entering as well exiting your farm.

Although trees around the perimeter of houses offer many potential advantages, there are some negative aspects that one needs to consider. These include; a limited amount of land will be taken out of production, cost of the trees, labor for planting and maintenance, restricted

view of your houses, limit farm access to designated roadways, and a potential habitat for wild birds. A tree program may not be workable for some farms and on many farms the perimeter of the houses may already offer partial windbreak protection.

AT WHAT DISTANCE SHOULD TREES BE PLANTED FROM MY POULTRY HOUSES?

This depends on your farm situation, house orientation, type of ventilation system, the tree species and the width of the windbreak. For tunnel-ventilated houses and planned retrofits to tunnel ventilation, multiple rows of dense evergreens around the farm perimeter make a wood visual screen, vegetative filter and windbreak.

On the tunnel fan end of the house consider additional rows of dense evergreen or deciduous trees for maximum filtering during summer operation. For greatest emissions scrubbing, tree lines should be as close to the tunnel exhaust fans as possible. As a general rule-of-thumb, to not interfere with fan efficiency, no trees should be planted closer than a distance of five times the diameter of the fans.

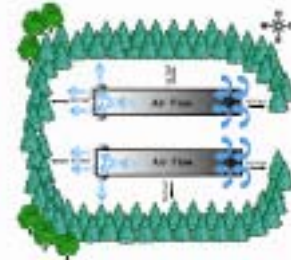
On the inlet end of the house, tall evergreens or deciduous trees may be considered to provide a 'cooling' effect of the air and soil during summer months. Minimum distance to the closest row of trees along the side of the house is 50 feet and on the end of the houses, 80 feet. If you don't have these minimum distances, consult with your poultry company for workable distances. Anticipated width of the tree spread at maturity needs to be a factor in the spacing consideration.

Tree planting around conventional-ventilated houses require strategies to meet different objectives. On the north, east and west perimeters of the farm, multiple rows of dense evergreens may be used for a visual screen, vegetative filter and windbreak. Since prevailing winds in summer are from the southwest, to provide a partial visual screen with shade and minimum air blockage on this side, planting tall evergreens and/or deciduous trees with no lower limbs may be an option when located at least 100 feet from the houses. For houses having a western sidewall exposure, tall, wind-tolerant, deciduous trees for maximum roof shading has merit and, in some cases may be an option between the houses. Plantings on the ends also require 80 feet distance for the load-out operation.

The following schematic is an example of possible plantings for tunnel-ventilated houses.

The maximum benefit from windbreaks is felt five times the height of the tallest trees growing in the windbreak when they reach about 20 years old. Therefore, if the total height of your tallest tree at age 20 is 30 feet, then the maximum windbreak effect will be 150 feet. For the best 'wind lifting' effect, the north and west rows of your windbreak make a progression of low evergreen shrubs or trees on the outmost row to taller evergreen trees for the inside row.

Several other factors need to be considered. On all farm types, a tree line is recommended to "screen" manure sheds and dead-bird composters. For tunnel-ventilated farms this may involve two sets of tree lines, one near the tunnel fans and another to screen the manure and composter facilities. Trees should not be planted near areas of an outside litter stockpile since the high nutrient concentrations can kill trees. Property lines, dwellings, traffic visibility, surface and sub-surface drainage rights-of-ways, overhead and below-ground wires also will determine tree placement.



WHAT TYPE OF TREES ARE BEST SUITED FOR POULTRY FARMS?

Plant the RIGHT tree at the RIGHT place and for the RIGHT purpose! Every farm will differ and a management plan will need to be developed to meet specific farm objectives and requirements. This plan needs to consider the desired objectives (ie., visual screen, vegetative filter, windbreak) to be achieved for each side of your farm. Plant only species native to your area.

Desirable features of trees for poultry farms include maximum vegetative density and/or waxy or "hairy" leaves for efficient filtering ability, tap or deep roots, wind tolerant, low maintenance and care, medium to fast growth and tolerant to nutrients found around houses.

You may want to avoid shrubs and trees that attract wild birds due to seeds or nesting site and those with a wide crown that obstructs traffic.

Examples of native trees that “might” be considered for Delmarva include; Eastern white pine, Virginia pine, Loblolly pine, Eastern red cedar, Sawtooth oak, and Red maple. A more complete listing of characteristics of native and non-native trees for planting in Delaware can be found at the following web site:

<http://ag.udel.edu/extension/renewresources/publications.htm>

For additional information call your county Extension office or local conservation district.

The urgency of implementing a ‘privacy’ screen, vegetative filter or windbreak may dictate both the selection of tree species and size of the stock to plant. It is recommended that you plant the outer (windward) side of your windbreak with plant material that is larger than ½ inch caliper (seedling size) and with stock at least 2 years old. Native species should comprise at least 80% of your total planting species for the entire windbreak. Windbreaks should not be one single species, but contain a diversity of tree and shrub species. If you invest in larger stock or plant during warm weather, consider installing drip irrigation to insure survivability.

DON'T PLANT INVASIVE SPECIES OF TREES OR SHRUBS IN YOUR WINDBREAK!

WHAT ARE THE PLANTING RECOMMENDATIONS AND MAINTENANCE REQUIREMENTS FOR TREES?

Planting recommendations depend on the location of your windbreak (i.e., if it is to be established in an area where there is heavy brush cover or in an open, newly plowed field; soil type; available soil moisture; exposure: south, east, west, north, etc.). A windbreak is a linear establishment of multiple rows of trees and shrubs planted perpendicular to the troublesome winds. These multi-row windbreaks should be 2-5 rows thick, but vary according to your particular need, location and situation.

Site preparation for weed management is a critical preparation step, especially during the first few years of establishment. Weeds compete for nutrients and water. They create a habitat for ground rodents that girdle new tree stems at the root collar. Once the trees are established, probably after the third year, maintenance requirements are significantly reduced. You may want to use tree shelters when planting hardwood seedlings. The distance between

trees within and between rows depend on such factors as plant species, objectives of the planting, farm situation and width of your mowing equipment.



Established windbreaks require a 60-80% density year-round. Make sure the windward side of your windbreak contains evergreen species that retain their lower branches close to the ground, or you may need to come back and interplant evergreen shrubs to compensate for the opening. In some situations, it may be desirable to make plantings over multiple years, plant trees with different ages of longevity and, in some cases, thin the trees as the windbreak matures.

CAN I GET TECHNICAL AND FINANCIAL ASSISTANCE FOR PLANTING TREES?

If you are interested in obtaining federal, state or local cost-share assistance for this conservation practice, contact your local Conservation District office and follow the USDA-NRCS conservation practice guidelines. Some states use the standard for farmstead windbreak/shelterbelt establishment (Code 380). At this writing, Delaware and Maryland are considering using the newly formed Agricultural Management Assistance program to fund (75% cost-share) windbreaks for poultry farms. In Virginia, this practice is being evaluated as a best management practice for potential cost-share. It is important to call your local Conservation District at least six months in advance of expected planting date (February-April most desirable time for planting most tree species) to sign up for the program. This is necessary to have a conservation and tree plan developed for your farm. It will also allow time to place an order for the seedlings. Without advance notification, tree stocks may not be available when you are ready to plant.

If you choose not to participate in a cost-share program, it is strongly advisable you seek guidance on developing a tree plan for your poultry farm. Your local Cooperative Extension office or Conservation District can assist you with your plan. The cost of planting trees on poultry farms is relatively inexpensive. For two-year old Eastern white pine/Eastern

red cedar seedlings, the cost of stock for two-house farms may be less than \$200. However, there will be additional labor, site preparation and maintenance cost. Both hand and mechanical tree-planting equipment may be available from your state forestry department. Check to see the availability of the equipment and the cost of having them to custom-plant your trees.

Special appreciation is expressed to Sally Griffith-Kepfer, State Resource Conservationist, USDA-NRCS, Delaware for her assistance.

Funding for this publication was provided in part by the Delaware Nonpoint Source Pollution 319 Grant and Maryland Department of Agriculture

Delaware:

New Castle Conservation District

6 Peoples Plaza
Newark, DE 19702
ph: (302) 834-3560

Kent Conservation District

3500 S. duPont Highway
Dover, DE 19901
ph: (302) 697-2600

Sussex Conservation District

408 N. duPont Highway
Georgetown, DE 19947
ph: (302) 856-3990

Maryland:

Caroline Soil Conservation District

640 Legion Rd, Suite 3

Denton MD 21629

ph: (410) 479-1202

Dorchester Soil Conservation District

501 Court Lane, Rm 213

Cambridge, MD 21613

ph: (410) 228-5640

Kent Soil Conservation District

122-4 Speer Road Chestertown, MD 21620

ph: (410) 778-5150

Queen Anne Soil Conservation District

505 Railroad Ave., Suite 3

Centreville, MD 21617

ph: (410) 758-3136

Somerset Soil Conservation District

30730 Park Drive

Princess Anne, MD 21853

ph: (410) 651-1575

Talbot Soil Conservation District

215 Bay Street

Easton, MD 21601

ph: (410) 822-1344

Wicomico Soil Conservation District

2322 B. Goddard Pkwy
Salisbury, MD 21801
ph: (410) 546-4777

Worcester Soil Conservation District

P.O. Box 97
Snow Hill, MD 21863
ph: (410) 632-5439

Virginia:

Eastern Shore Soil & Water

Conservation District
23378 Commerce Drive, Suite 3
Accomac, VA 23301
ph : (757) 787-1251

Delaware:

George W. Malone
U. of D. Cooperative Extension
Research & Education Center
16684 County Seat Highway
Georgetown, DE 19947
ph: (302) 856-2585 ext. 309

Dot Abbott-Donnelly
U. of D. Cooperative Extension
69 Transportation Circle
Dover, DE 19901
ph: (302) 730-4000

Maryland:

Nick Zimmermann
U. of MD Cooperative Extension
Lower Eastern Shore Research and Education Center
11990 Strickland Drive
Princess Anne, MD 21853
ph: (410) 651-9111

Virginia:

Jim Belote
Virginia Tech Cooperative Extension
23203 Front Street, P. O. Box 60
Accomac, VA 23301-0060
ph: (757) 787-1361