



Establishment of Vegetative Environmental Buffers Around Poultry Farms

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Introduction

For many years the poultry industry has discouraged planting tall crops, shrubs or trees around poultry houses for fear the vegetation would restrict summer-time ventilation in naturally-ventilated poultry houses. However, in recent years the industry has shifted to tunnel-ventilated, windowless housing operations. Blocking airflow is no longer a major concern with this style housing. Emission of pollutants from poultry houses in general, and tunnel fans that are directed toward neighbors in particular, has become a major issue. These concerns have been compounded with urban encroachment around farms in many poultry producing regions of the country. Following several neighbor complaints about tunnel fans directed towards adjoining residual homes in the late 1990's, the University of Delaware started a proactive initiative of planting trees around farms as a visual screen, vegetative filter and shelterbelt/windbreak. Over the past five years 18 different demonstrations have been conducted to characterize various aspects in establishing vegetative environmental buffers (VEB) as a possible cost-effective strategy to address these urban encroachment and poultry-house emission issues. The following is a synopsis of these on-going efforts.

Lessons Learned From Vegetative Environmental Buffer Planting Demonstrations

The selection, arrangement and distance trees are planted from exhaust fans is critical. Observations to date suggest plantings be installed at a minimum distance of 10 times the fan diameter. Although evergreens with complex leaf shape are ideal for capturing particulates, plantings closer than 10 times the fan diameter sometimes results in severe feather matting and tree mortality. Planting deciduous trees in the first row closest to tunnel ventilation fans appears to be one option to avoid tree mortality. Particulates that accumulate on the vegetation during operation of these warm-weather fans drops-off with the leaves in the fall and the vegetative filter is renewed for the following spring. Evergreen trees with waxy leaves (i.e. holly), planted closer than 10 times the fan diameter in the first row opposite fans, appear to better withstand the high particular loads being emitted by the exhaust fans. Limited success was obtained with misting or washing off particulate loading on tree leaves. Although Eastern white pine plantings as the first row opposite fans have died apparently due to emissions, this tree may be an option in non-discharge areas. To address potential concerns of warm air from the exhaust fans causing thermal stress on the trees, temperature measurements in the exhaust plume were obtained from 36-inch sidewall and 48-inch tunnel ventilation fans during winter and summer, respectively. Compared to temperatures in non-fan plume areas, there does not appear to be any potential for thermal stress on trees at distances of 12, 22 and 42 feet from the fans.

Irrigation is essential to insure plant survivability, maximize early growth and is a requirement for growers receiving financial assistance for this practice in the region. Similarly, weed control is critical during the first few years of establishment of a VEB. An irrigation system using an emitter(s) to each tree and covering the row with weed mat or polyethylene appears to be an efficient way to address these matters. Recent hybrid willow cuttings planted in this fashion have achieved growths of 8 to 10 feet the first year.

Poultry growers that have implemented plantings incorrectly, failed to control weeds or provide irrigation have had marginal success in establishing a VEB. Therefore, poultry growers are strongly encouraged to seek technical assistance in the design, implementation and maintenance of VEB. The selection of plant material and arrangement of trees in a VEB plan must be designed for each side of every house, for each individual farm and must address the three goals of a VEB: visual screen, vegetative filter and shelterbelt. Retrofitting a VEB around existing houses poses many challenges due to boundary, structural, traffic patterns and other land-use restrictions. When the construction of new houses is being considered on the Delmarva Peninsula, the current recommendation is to include a VEB as part of the layout and design of

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the farm. To be responsive and proactive to escalating neighbor-relations and emission issues, the local poultry industry trade association plans to hire a coordinator to facilitate in the design, installation and maintenance of VEB on poultry farms in this area.