

INTRODUCTION

Poultry houses generate particulates, ammonia, and other odors that are expelled from the houses by the ventilation system. Particulates (dust, bits of feathers, bedding, and manure) have been linked to respiratory effects in poultry workers, and can be a source of complaints from neighbors who live near poultry farms. Ammonia emitted from poultry houses has been linked to degradation of air and water quality in the Chesapeake Bay.

Tall, stiff-stemmed warm-season grasses can be planted near poultry house ventilation fans to help trap particulates, reduce the dispersal of ammonia and other odors, and also serve as visual screens, especially when planted with trees and shrubs. Grasses have a large number of stems and relatively small leaves that provide a dense barrier to fan emissions. Warm-season grasses are more tolerant of heat and drying winds than most tree/shrub barriers, and can be planted alone or in front of shrubs and trees to provide an initial filter for ventilation fan emissions, and to slow wind speed and provide shelter for the subsequent rows of shrubs and trees.

This fact sheet provides instructions for installing and maintaining warm-season grasses so that they can serve their intended purpose. Using proper installation and management, especially during establishment, will significantly improve plant health and survival.

SITE PREPARATION

Site conditions, including soil quality and the type and density of existing vegetation, will determine the amount of site preparation you will need to do before planting. Around buildings and other structures, soil may be heavily compacted or contaminated with construction debris, gravel, and other fill material that can severely hinder plant rooting and survival.

If existing grasses or weeds are tall, you should mow or brush hog the planting strips. It is recommended that the planting strips either be tilled up or treated before planting with a non-selective herbicide such as glyphosate (for example, Roundup or KleenUp), following all label directions.



Figure 1. Recently planted warm-season grasses.

INSTALLATION

Always check for utility lines (gas, water, cable, electricity) before planting. Avoid planting on top of buried utility lines or under low-hanging overhead lines.

Planting Design

Every poultry house will differ as to the location of ventilation fans, access roads, drainage ditches, etc., so each planting design will need to accommodate these features. Where vehicle access is needed, locate the hedgerow a minimum of 50 feet from the sidewall and 80 feet from the end of the house. If the house does not have tunnel ventilation and has a south or west exposure, use a minimum setback of 100 feet to provide for air movement.

Effectiveness for intercepting particulates and odors improves when hedgerows are oriented perpendicular to prevailing winds. Wider (deeper) and taller plantings are more effective than narrower, shorter ones. Hedgerows positioned closer to poultry houses contain or limit dispersion of more emissions than those further away. Long, uninterrupted hedgerows (at least 10 times as long as high) are more effective than shorter ones with gaps.

Use containerized plants (1-quart containers or larger) that have well-developed root systems. Plants of this size will be able to survive better in the harsh

Land owners and managers please note: If you receive financial assistance for your hedgerow, be sure to check with your funding agency/organization for specific management requirements.

conditions near the ventilation fans than smaller plants or seedlings. Use a minimum of two rows of grasses (if planted alone), or one or more rows of grasses planted in front of one or more rows of shrubs and/or trees. Plant the grasses 3 feet apart on center within and between rows, with a staggered planting arrangement between rows (see Figure 4, page 4). It also is advisable to use more than one species or variety of grass so that a single insect or plant pathogen won't devastate the entire planting.



Figure 2. Warm-season grasses can be planted near the ventilation fans, either alone or as an initial barrier in front of trees.

For optimum effectiveness trapping particulates and absorbing ammonia, grasses should be planted as close as possible to the ventilation fans, but no closer than 20 feet from the fans. At this distance, the effects on fan performance were not measured but no obvious adverse effects were observed.

The length of the rows should extend an additional 20 feet from the beginning and end of the ventilation fans. For example, if the total width of multiple fans is 40 feet, then the total length of the warm-season grass rows would be 80 feet (20 + 40 + 20).

Plant Availability and Planting Dates

Containerized plants are usually available throughout the year. The preferred planting times are in the fall or spring, but the grasses can also be planted during the summer months if irrigation will be used. Planting during the dormant period (winter and early spring) is also an option if plants are available and the ground is not frozen.

In ventilation fan impact areas, planting 1-quart container stock in the spring, along with irrigation and good weed control, should produce the best results for plant survival and growth.

Storing and Planting Techniques

Containerized stock can be stored for extended periods if the plants are protected from harsh conditions. Store plants in partial to full shade and water as needed to keep moist.

Containerized grasses are usually planted by hand. Dig a planting hole, remove the pot from the root ball, and set the plant in the hole.

Adding sand, peat, compost, or other materials to a planting hole is generally not recommended unless the soil is excessively compacted or otherwise has very poor quality. The warm-season grasses recommended in this fact sheet are tolerant of poor soil conditions and can usually be planted in natural soil without soil amendments.

If soil amendments are needed, the best approach is to rip or deep-till a wide planting strip and add the materials to the entire strip. If this is not feasible, then dig a wide planting hole (at least two or three times the diameter of the pot) and mix the excavated material with the soil amendments. A mixture of three parts soil to one part compost is recommended for each prepared hole.

Lime and Fertilizer

Newly planted warm-season grasses do not need to be limed and fertilized, unless soil tests show that pH and nutrients are extremely low. For most sites, it's best to allow the new plantings to become established before applying fertilizer.

Irrigation

Installation of a trickle or emitter irrigation system is highly recommended for all plantings and is a requirement if receiving NRCS financial assistance. Between rows of grasses, use ½-inch polypropylene irrigation line with 0.5 gallon per hour emitters placed every 12–18 inches, or 15 mil thickness drip tape with 12-inch dripper spacing.

Contact your local NRCS Service Center for a list of suppliers or irrigation companies. Be careful where you tap into your water system. Many integrators meter the water consumption for each poultry house.

Weed Control Barriers

Wood products, such as shredded or chipped hardwood bark, pine bark, bark chips, and wood chips, can be used as mulch around the plants, but will not provide long-term weed control unless more mulch is periodically added. Apply mulch to a depth of 3 to 4 inches. Use a minimum 3-foot wide strip of mulch in the planting row, or at least a 3-foot diameter circle of mulch around each plant.

Black polyethylene sheeting (6 mil thickness) or woven plastic landscape fabric can also provide an effective weed barrier. Black poly is generally cheaper than landscape fabric and works well if trickle or emitter irrigation is also implemented. Be aware that woven plastic fabric can be difficult to remove after plants are established because roots will grow into the material. Additional drawbacks to these artificial weed control barriers include increased soil temperatures that may limit beneficial microbial activity, and the inconvenience of disposing of the materials when they are no longer needed.

Treatment of the site with a pre- and post-emergent herbicide before planting is also helpful for controlling weed growth.

ESTABLISHING AND MAINTAINING THE PLANTING

Establishing the Planting

Planting year. After planting, keep plants watered during extremely dry periods. Warm-season grasses are more tolerant of drought and harsh conditions than cool-season grasses or most trees and shrubs, but supplemental moisture applied during the establishment period will improve plant survival, growth, and overall health. New plantings become established more quickly when watered as needed.

On well-drained loamy soils, new plantings usually need at least ½-inch of water per week from rainfall or irrigation in late spring and summer. On sandy soils, plants may need at least 1 inch of water per week, preferably in two separate ½-inch waterings. On heavier soils or wet sites, plants may need less water. Watering should be sufficient to moisten the soil to the depth of the roots — at least 1 foot deep. (Note: Roots will be much deeper once plants are established.)

Weed control is extremely important to the establishment and longevity of the planting. Control weeds around plants by weed wacking (or high mowing), hand pulling, treating with an appropriate herbicide, or a combination of these methods. Pre- and post-emergent herbicides may also be used if weeds are abundant. Herbicides can be spot-sprayed around plantings or applied to the planting strip. Do not apply herbicides when ventilation fans are active or on windy days because spray drift can damage nearby plantings.

Control noxious weeds at all times according to Delaware state law. Noxious weeds are Johnsongrass, burcucumber, Canada thistle, giant ragweed, Texas panicum, and Palmer amaranth. For more information about controlling specific weeds, contact your local Delaware Cooperative Extension office or the

Delaware Department of Agriculture, Plant Industries section.

Second year after planting. Continue to water plants, as needed. Control weeds by weed wacking, mowing, hand pulling, or treating with an herbicide. Always avoid damaging the plantings during weeding and herbicide application. If using wood mulch around plants, do not exceed a total thickness of 4 inches (new mulch, plus any remaining old mulch). Replace any dead plants until the barrier is functional.



Figure 3. Late summer, second year after planting. These warm-season grasses are at least 6 feet tall.

Maintaining the Planting

By the third year, the grasses should be well-established. Continue to monitor the planting for any problems that need to be addressed. See Table 2 for a monthly summary of maintenance activities.

If plastic landscape fabric or black poly sheeting was used for weed control, the openings will need to be enlarged as the grasses grow so that the weed barrier does not constrict growth. The weed barrier should be removed after 3 growing seasons.

After the grasses have gone dormant, as early as October and as late as mid-April, cut or mow stalks to about 6 inches from ground level. Some farmers have used the cut stalks of the grasses for duck blinds or as a poultry litter substitute. There is also potential for use of the stalks for biofuels.

Table 1. Recommended warm-season grasses for planting near poultry house ventilation fans.

Common Name	Scientific Name	Cultivar	Mature Size (width x height)	Remarks
PANICGRASS, COASTAL	<i>Panicum amarum</i> var. <i>amarulum</i>	'Atlantic' or 'Dewey Blue'	3' x 6'	Quickest to establish, but not as stiff-stemmed as others on this list. 'Dewey Blue' has especially attractive bluish leaves. Do not plant Coastal Panicgrass on wet sites.
CORDGRASS, PRAIRIE	<i>Spartina pectinata</i>	Common	6' x 8'	Prefers wet sites (e.g., swales between poultry houses), but also tolerates dry sites and saline environments. Can spread rapidly by rhizomes, up to 2 feet in a growing season, to make a dense mat.
SWITCHGRASS	<i>Panicum virgatum</i>	'Kanlow'	5' x 7'	Vigorous lowland switchgrass, typically used for biofuel production. Especially good for moist soils.
SWITCHGRASS	<i>Panicum virgatum</i>	'Northwind'	2' x 6'	Does not spread as much as other cultivars. Useful for planting closest to the ventilation fans if space is limited.
SWITCHGRASS	<i>Panicum virgatum</i>	'Thundercloud'	4' x 8'	Tallest switchgrass cultivar on this list. If using multiple rows, can be planted downwind of shorter plants. Also can be placed at greater distances from ventilation fans due to taller height.
SWITCHGRASS	<i>Panicum virgatum</i>	Timber Germplasm	5' x 7'	Vigorous lowland switchgrass, typically used for biofuel production. Especially good for moist soils; lodges a little less than 'Kanlow.' Commercial availability of container plants may be limited.

Figure 4. Warm-season grass planting layout.

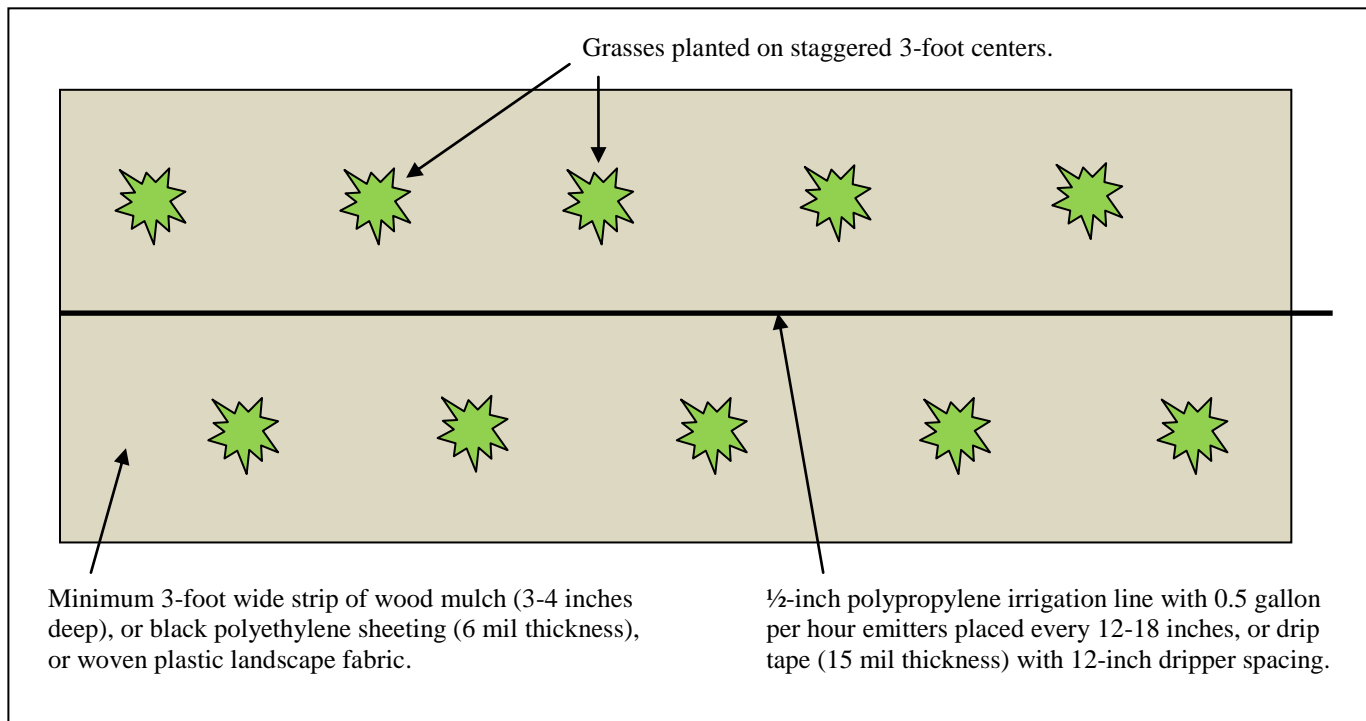


Table 2. Warm-season grass planting, maintenance, monitoring and evaluation calendar.

Activity ^{1/}	Recommended Time of Year											
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
<i>Planting</i>												
Containerized Plants												
<i>Maintenance</i>												
Mulching												
Watering												
Monitoring ^{2/}												
Evaluation ^{3/}												

Notes:

- Activity** – Recommended during the time of year shaded in green.
- Monitoring** – Pay special attention during these months to mulching and watering needs, weeds to be cut/sprayed, or disease or insect infestations that may be controllable. Monitor for a minimum of the first two growing seasons. Frequent monitoring will help you to identify problems early before damage becomes extensive.
- Evaluation** – Assess survival of the plants in late summer and determine the need for replanting.



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