Management of Grasses for Biofuel

Purpose: The purpose of this publication is to describe the current best management practices for grass pellet feedstock.

When a market exists for grass pellets, the following are the suggested guidelines for optimizing yield and quality of grass in an environmentally acceptable manner.

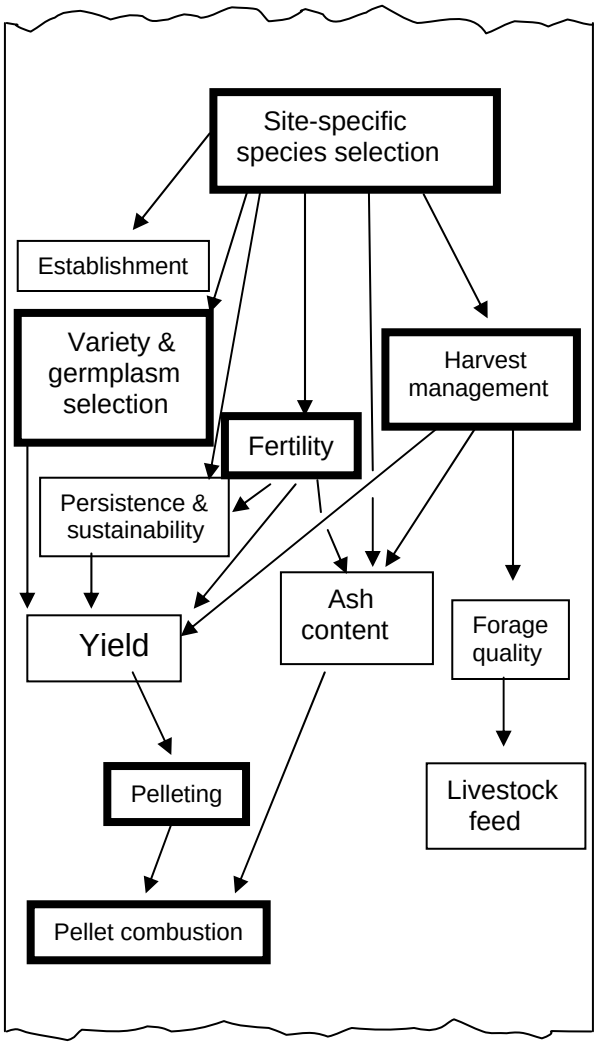
Switchgrass Reed canarygrass

Major components to consider

With cool-season grasses, the system components in the bolded boxes of the diagram are those that can be modified to optimize yield and quality of grass pellets. Site selection, fertility, and harvest management are the factors that that most infuence the system.

Species/Site selection. For maximum biomass potential, a single grass species can be sown. Site-specific species selection assistance for NY can be found at www.grassbioenergy.org. At this time the top two species that would be planted specifically for biomass are switchgrass and reed canarygrass. Upland varieties of switchgrass are more winter hardy, but are not very tolerant of the poor drainage conditions often found in the Northeast USA. Any variety of reed canarygrass can be grown on all agricultural soil types in NY.

Existing mixed grass stands can also be utilized for biomass production. Yields will be lower, but biomass quality can be acceptable.



Read from top to bottom, arrows indicate which components influence other components below them.

Fertilization. Some N fertilization will significantly increase yield. Animal manure can be used for this purpose, particularly on farms with manure management issues. Ideally, the amount of P and K applied would be minimized, however, as they do not greatly affect yield or persistence, and high soil K will result in increased K content in grasses.

No weed, insect, or disease control is necessary with cool-season grasses. Herbicides are often used for weed control in switchgrass.

Harvest management – Switchgrass. Fall harvest of this late maturing warm season crop may be difficult; a wet fall could prevent baling of dry hay. Switchgrass left in the field overwinter may be as low as 2% ash in the spring due to leaching and loss of high ash plant parts. A 15-50% yield reduction can be expected with spring harvest. Another option is to cut in late summer, leaving enough time to ensure in-field leaching and baling of dry hay.

Switchgrass Reed canarygrass
Cut in early August in NY.

Harvest management – Reed canarygrass.
Ash content of biomass declines with grass maturation. Cut cool-season grasses sometime between late July and early September. Early August might be best, allowing time for in-field leaching of cut biomass, and allowing time for manure application following biomass removal from the field.

Cut grass should be left on the field for a minimum of a week or two to allow for leaching. The two elements that cause the most concern for combustion applicances, potassium and chlorine, are both in water soluble forms in the grass and can be leached out of the cut grass.

August-cut switchgrass left in field to leach.

Avoid Soil Contamination. It is critical to minimize soil contamination of the feedstock. It does not take much soil to increase the ash concentration of the feedstock. Typically dry fields in mid summer with a protective sod cover provide good conditions for minimizing soil contamination. A tedder can be used to re-dry windrows after rainfall events, but care must be taken to set the teeth high enough to avoid digging up soil. The same care should be taken when raking or merging the hay into windrows for baling.

Baling occurs after leaching and before there is significant grass regrowth.

Bale hay at low enough moisture content to prevent heating or molding in storage. Hay at a standard moisture content (12-15%) is acceptable for storage and for pelleting.

Switchgrass must be cut at about a 6 inch stubble height in late summer to ensure stand persistence, but there is no stubble height requirement in the late fall. Cool-season grasses such as reed canarygrass, will have some regrowth in the fall. It is best to leave this regrowth unharvested to provide winter/spring wildlife cover and to help maintain soil sustainability.

For more information

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