NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE SPECIFICATIONS

FORAGE HARVEST MANAGEMENT

(Ac.)

CODE 511

Forage should be harvested to meet the land resource objectives and associated resource concerns according to the Forage Harvest Management (511) standard.

Forage will be harvested at a frequency and height that optimizes the desired forage stand, plant community, and stand life.

Forage Harvest Heights

The height at which forage is harvested should be plant specific. Refer to table 1 for minimum harvest heights for various plant species.

Forage Harvest Timing

The maturity of forages is the largest factor contributing to quality. As plants mature, the percentage of cell walls and/or plant structural material begin to increase. This measurement is commonly referred to as Neutral Detergent Fiber (NDF) and Acid Detergent Fiber (ADF). The increased fiber content in fiber usually results in lower crude protein (CP),total digestible nutrients (TDN), and decreased palatability. Refer to table 1 for recommended times to harvest forages.

Hay Moisture

Hay should be harvested between 80% and 85% dry matter (DM). Hay baled at below 80% will develop mold and will reduce hay quality. Hay baled at high moisture (low DM) will heat. Heating can be so significant that a fire risk is possible.

Do not transport hay in a baler, trailer, or any other kind of transportation until any potential fire risk is eliminated. The air flow during the transportation can help fuel a fire.

Hay should remain below 120°F to reduce fire hazard.

Hay Quality

Steps to improve hay quality include:
1) fertilize and lime according to soil test,
2) harvest at appropriate stage of maturity,
3) harvest hay with no rain damage, and
4) decreasing hay equipment damage to plants, and
5) storage of hay.

Fertilize and Lime to Improve Hay Quality

Nitrogen fertilizer can increase the CP of forages. Supplying the soil with the recommended soil nutrients from a soil test analysis will show positive results from the forages harvested.

Harvesting Hay with no Rain Damage

Rain leaches out nutrients in hay and increases the likelihood of mold. While all-weather precautions should be made prior to cutting hay, its worse if high DM hay becomes saturated compared to low DM hay.

Decreasing Hay Equipment Damage to Plants

Forages such as legumes are susceptible to "leaf shatter" due to the hay equipment. Although unavoidable, a few steps should be considered to decrease the leaf shatter.

First, if your hay contains legumes, tedder and rake hay before forage moisture levels fall below 40%.

Secondly, if your hay has legumes and teddering isn't necessary, simply rake the hay. Raking can help hay cure the hay without the additional pass with a tedder. Hay should be teddered if a client is trying to 1) dry hay before an anticipated rain, 2) increase drying time of thick hay, 3) increase drying time of hay that is wet due to rain.

Hay Storage

Less waste occurs storing hay inside a barn compared to outside. The amount of hay loss due to waste from sitting outside can be significant (e.g. 30% or more DM wasted). However, some clients have no choice but to store hay outside. Subsequently, the location of outside hay storage sites can have an impact on decreasing waste.

Hay should be placed in a sunny, well-drained location. If possible, place the hay off of the soil, such as on a gravel pad or a concrete pad.

Leave a space approximately between the round sides of bales to prevent accumulation of water.

Place round bale roles going north and south rather than east and west, if possible.

Don't stack hay near locations that flood or may be prone to lightning strikes.

Using Hay as a Nutrient Uptake Tool

Harvesting hay can be an effective tool for removing excessive nutrients. Certain nutrients (e.g. phosphorus) can have negative environmental effects at high levels. Certain regions/watersheds in Arkansas have excessive phosphorus. Use this method only in areas identified as excessive nutrient surplus areas for phosphorus.

Identify potential fields with excessive phosphorus loading. Evaluation should be completed only through soil test analysis.

Nutrients should be applied according to soil test results to the field being prepared for hay harvest. Nutrients will be applied during early vegetative stages of the plant's growth curve. Do not apply any phosphorus. Do not apply any manure for a substitute because it will contain phosphorus that is trying to be removed.

Allow the field to rest from any grazing until a suitable balance between forage quality and quantity it present. Refer to table 1 if producer's objectives are to maximize forage quality.

Remove the hay from the field for storage. Feed hay on sites that have less than optimum phosphorus. Hay should be fed away from any environmental sensitive areas.

References:

Southern Forages, 4th Edition

IPNI Forage Crop Pocket Guide

University of Arkansas CES; MP434
Management of Hay Production

Table 1: Recommended Harvest Heights and Maturity Stages		
Plant Species	**Minimum Heights**	**Recommended Stage to Harvest**
Bermudagrass, hybrid	2”	First Harvest: 15” to 18” Second and later harvests: every four to five weeks
Bahiagrass	2”	Boot
Clover, arrowleaf	2”	Early bloom
Clover, crimson	2”	Early bloom
Clover, red	2”	Early bloom
Clover, white	2”	Cut at correct stage for companion grass
Dallisgrass	2”	Boot to bloom
Johnsongrass	6”	Boot
Tall Fescue	3”	First Harvest: Boot to early heading Regrowth: four to six week intervals
Orchardgrass	4”	First Harvest: Boot to early heading Regrowth: four to six week intervals
Sudangrass	6”	30 to 40 inches
Ryegrass	2”	Boot to bloom (annual ryegrass must mature for re-seeding potential)
Pearl Millet	6”	30 to 40 inches
Big Bluestem	8”	Boot; Don’t harvest later than August 15th; No more than two cuttings per year.
Indiangrass	8”	Boot; Don’t harvest later than August 15th; No more than two cuttings per year.
Switchgrass	8”	Boot; Don’t harvest later than August 15th; No more than two cuttings per year.
Eastern gamagrass	8”	Boot; Don’t harvest later than August 15th No more than two cuttings per year.

Sources: Southern Forages; IPNI Forage Crop Pocket Guide; UTK SP731-D Producing Hay from NWSG

Table 2: Maturity Stages for Grasses	
Plant Species	**Minimum Heights**
Vegetative	Leafy growth
Late vegetative	Stem elongates
Boot	Stem elongated; top of stem swollen
Early bloom	Seed heads begin to emerge
Mid bloom	At least 25% of seedheads emerged, pollen beginning to shed
Full bloom	Most seed heads emerged; peak pollen shed
Milk	All seed heads emerged; seed forming, seed soft and immature
Dough	Seed becoming harder and having a doughlike consistency
Mature	Seed hard and ready for harvest

Sources: Southern Forages; IPNI Forage Crop Pocket Guide