

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

FORAGE HARVEST MANAGEMENT
(Acre)
CODE 511

DEFINITION

The timely cutting and removal of forages from the field as hay, green-chop, or ensilage.

Forage will be harvested at a frequency and height that will maintain a desired healthy plant community through its life expectancy.

PURPOSE

- * Optimize the economic yield of forage at the desired quality and quantity.
- * Promote vigorous plant regrowth.
- * Maintain stand life for the desired time period.
- * Maintain desired species composition of the stand.
- * Use forage plant biomass as a nutrient uptake tool.
- * Control insects, diseases and weeds.
- * Maintain and/or improve wildlife habitat.

Stage of Maturity

Harvest forage at the stage of maturity that provides the desired quality and quantity.

Delay harvest if prolonged or heavy precipitation is forecast that would seriously damage cut forage.

Where weather conditions make it difficult to harvest the desired quality of forage, use mechanical or chemical conditioners and/or ensile.

Moisture Content

Harvest silage/haylage crops at the ideal moisture range for the type of storage structure(s) being utilized.

Treat direct cut hay crop silage (moisture content > 70%) with chemical preservatives or add dry feed stuffs to avoid fermentation and seepage digestible dry matter losses.

For optimal forage quality, rake, ted, or invert swaths, and bale when hay has sufficient moisture to prevent leaf loss.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all land uses where machine harvested forage crops are grown.

CRITERIA

General criteria applicable to all purposes.

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

Bale at optimum moisture levels to preserve forage quality and quantity.

Approximate percent moisture should be as follows:

- * Bale field cured hay at 15 to 20 percent moisture.
- * Bale forced air dried hay at 20 to 35 percent moisture.
- * Rake hay at 30 to 40 percent moisture.
- * Ted or invert swaths when moisture is above 40 percent.

Length of Cut

When harvested for ensilage, forage will be chopped to a size that allows adequate packing to produce the anaerobic conditions necessary to ensure the proper ensiling process.

Contaminants

Forage shall not contain contaminants at levels injurious to the health of the livestock class and type being fed.

Contaminants are any objectionable matter or toxin that can cause illness, death, or rejection of the offered forage.

Additional criteria for improving or maintaining stand life, plant vigor, and forage species mix.

Stage of Maturity and Harvest Interval

Cut forage plants at a stage of maturity or harvest interval range that will provide adequate food reserves and/or basal or auxiliary tillers or buds for regrowth and/or reproduction to occur without loss of plant vigor.

Cut reseeding annuals at a stage of maturity and frequency that ensures the production of viable seed or ample carryover of hard seed to maintain desired stand density.

If plants show signs of short-term environmental stress, management will be applied in a manner that ensures continued health and vigor of stand.

Stubble Height

Cut forage plants at a height that will promote the vigor and health of the desired species. Cutting heights will provide adequate residual leaf area; adequate numbers of terminal, basal, or auxiliary tillers or buds; insulation from extreme heat or cold; and/or unsevered stem bases that store food reserves needed for full, vigorous recovery.

Manipulate timing and cutting heights of harvest to ensure germination and establishment of reseeding or seeded annuals.

Additional criteria to use as a nutrient uptake tool.

Employ a harvest regime that utilizes the maximum amount of available or targeted nutrients.

Additional criteria to control disease, insect, and weed infestations.

If a foliar disease, insects, or weeds threaten stand survival or production objective, schedule harvest periods as needed to control disease, insect, and weed infestations.

Lessen incidence of disease, insect damage, and weed infestation by managing for desirable plant vigor.

Additional criteria to improve wildlife habitat values.

Maintain appropriate harvest schedule(s), cover patterns, and plant height to provide suitable habitat for the desired specie(s).

CONSIDERATIONS

When pastures produce forage in excess of livestock demand during high growth rate periods, consider preserving forage quality by machine harvesting a portion of the standing crop. Coordinate this practice with Prescribed Grazing (528).

Well-fertilized plants withstand more intense harvest schedules, and may produce a higher quantity and quality of forage. Coordinate this practice with Nutrient Management (590).

Select cultivars that are suitable for the harvest regime, species mix, and forage quality desired. For specific nutrient uptake,

select species that can maximize uptake. See Pasture and Hayland Planting (512).

When insect and disease outbreaks exceed economic thresholds and are uncontrollable by harvest management, pesticide applications may be needed. Another option is to select a resistant cultivar when the stand is replaced. See Pest Management (595).

To control forage plant diseases, insects, and weeds, clean harvesting equipment after harvest and before storing. Do not cut forages until dew, rain, or irrigation water on leaves have evaporated.

When weed infestation exceeds the economic threshold and is uncontrollable by forage harvest management alone, weed management should be planned and applied.

Take care not to produce stored forages whose quality is not that needed for optimum performance of the animal being fed. For instance, immature legume forages can be too low in fiber and lead to metabolic disorders in ruminants and an economic loss to the producer due to lowered animal performance.

Direct cut grass and legume silage can create silage leachate (seepage). Consider the collection, storage, and disposal of this leachate as part of an agricultural waste management system.

In conjunction with harvest options, explore storage and feeding options that will

retain acceptable forage quality and minimize digestible dry matter loss.

In regions where rainfall and/or humidity levels cause unacceptable forage quality losses in at least one harvest during the year, consider ensiling the forage to reduce or eliminate field drying time. Other options are the use of desiccants, preservatives, conditioners, macerating implements, or barn curing techniques to reduce field drying time; greenchopping; or grazing. These techniques can improve the timeliness of harvest and preserve forage quality.

To reduce safety hazard, avoid operating harvesting and hauling equipment on field slopes over 25 percent, particularly on cross slope traffic patterns.

PLANS AND SPECIFICATIONS

Place the detailed specifications in a site specific job or design sheet, or in the practice narrative in the conservation plan.

These plans and specifications shall be consistent with this standard and shall describe the requirement for applying the practice to achieve its intended purpose.

Hayland Management

Fertilization

Maintain the fertility level of hayland so that adequate soil protection and the

desired level of production are provided.

Soil test information is the best guide for determining the lime and fertilizer needs of hayland fields for soil protection, water quality, and production.

For cool-season grass hay (e.g., fescue), apply recommended amounts of phosphate and potash in one application anytime during the year. Apply 60 pounds of nitrogen per acre March 1-30. Where a second cutting is expected, apply an additional 45 pounds of N per acre for fescue or 60 pounds of N per acre for orchardgrass or timothy immediately after the first cutting. If fescue is stockpiled in the fall, apply 60 pounds of N per acre August 15 to September 15.

If urea is the nitrogen source, 5-55 percent loss of nitrogen may occur. Volatilization is most likely when urea is applied when pH and temperature are high and surface applied to moist soils followed by three or more days of rapidly drying conditions. When these conditions exist, ammonia nitrate would be the preferred nitrogen source.

Harvesting

Harvest information can be found in Table 1.

Other Hayland Management Practices

Management shall provide for optimum sustained yield of the plant resource, consistent with production goals.

For alfalfa production, see University of Tennessee Agricultural Extension Service P&SS INFO #12, Produce Alfalfa for High quality Hay.

Do not allow sericea lespedeza to overcure. Cut in the morning and rake that afternoon or the next morning to prevent excessive loss of leaves.

Sericea or native grasses should generally not be cut between September 1 and first killing frost (usually 28°F.). To do so will weaken the stand.

Allow alfalfa ample time between last cutting and first killing frost to build up food reserves before winter dormancy. This usually means that alfalfa should not be cut between September 15 and first killing frost. This recovery period is beneficial to most forages.

Haylage is another option of harvesting high moisture, high quality forage with less leaf and nutrient loss.

OPERATION AND MAINTENANCE

Before forage harvest, clear fields of debris that could damage machinery, or if ingested by livestock, lead to sickness (for example, hardware disease) or death.

Generally, competing species should be controlled depending upon their density before they become 6-12 inches tall. Control procedures will be performed as often as

necessary to ensure that stands are not lost to excessive competition.

For further information on weed control, refer to University of Tennessee publication, "Hay Crop and Pasture Weed Management," (PB-1521) by G. Neil Rhodes.

Monitor weather conditions and take action accordingly before and after cutting to optimize forage wilting or curing time to preserve feed quality and prevent forage swaths or windrows from smothering underlying plants.

Inspect and repair harvesting equipment following manufacturer's preventative maintenance procedures.

All shields shall be in place during machine operation to prevent injury or death. Shut off machinery before working on or unplugging moving parts.

Select equipment sizes and capacities that will in a timely and economically feasible manner handle the acreage normally harvested.

Operate all forage harvesting equipment at the optimum settings and speeds to minimize loss of leaves.

Set shear-plate on forage chopper to the proper theoretical cut for the crop being harvested. Keep knives well sharpened. Do not use recutters or screens unless forage moisture levels fall below recommended levels for optimum chopping action.

Regardless of silage/haylage storage method, ensure good compaction and an air-tight seal to exclude oxygen and mold formation.

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TA HARVESTING

SPECIES	PERIOD	WHEN TO HARVEST FOR MAXIMUM YIELD AND QUALITY	MINIMUM CUTTING HEIGHT (INCHES)
LEGUMES: Alfalfa	First Cutting Second Cutting Third Cutting	When in Full Bud 1/10 Bloom 1/10 Bloom (Allow 4-5 weeks of growth prior to the historic first freeze.)	3-4 3-4 3-4
Clovers Red and Alsike Birdsfoot Trefoil	First Cutting Second Cutting	1/4 to 1/2 Bloom Early Bloom	3-4 3-4
Crimson	Only Cutting	Early Bloom	
Sericea Lespedeza	First Cutting Second Cutting	When 10 to 12 Inches High Same as first (Allow 6-7 weeks of growth prior to the historic first freeze.)	3-4 3-4
Annual Lespedeza	Only Cutting	Early Bloom or Before Leaves Begin to Shatter	2-3
Grass-Legume Mixtures		When Legume is at Stage of Growth Stated Above or at Height Favorable to Other Desired Species	3
GRASSES: Bermudagrass	All Cuttings	When Plants are 10-15" Tall or Before Lower Leaves Turn Brown	2-3
Fescue, Tall and Orchardgrass	First Cutting Second Cutting	Boot Stage After 8-10" Recovery Growth	3-4
Matua	First Cutting Subsequent Cuttings	Boot Stage Allow Matua to Produce Mature Seed One Time During Grazing Season (Usually 45 Days)	3-4 3-4

TABLE 1: HARVESTING CONTINUED

SPECIES	PERIOD	WHEN TO HARVEST FOR MAXIMUM YIELD AND QUALITY	MINIMUM CUTTING HEIGHT (INCHES)
Timothy	First Cutting	Boot to Early Bloom When Basal Shoots Appear at Soil Surface	3-4
	Second Cutting		3-4
Reed Canarygrass	First Cutting	Early Boot Stage After 8-10" Recovery Growth	3-4
	Subsequent Cuttings		3-4
Johnsongrass	First Cutting	Boot Stage When Grass is 36" Tall Leave a higher stubble height (12") when last harvest is made. Allow 6-7 weeks of regrowth prior to the historic first freeze.	6-8
	Second Cutting		6-8
Native Grasses	First Cutting	Early Boot Stage (Before Seed Head Appears) When Grass is 36" Tall Leave a higher stubble height (12") when last harvest is made. Allow 6-7 weeks of growth prior to the historic first freeze.	6-8
	Subsequent Cuttings		6-8
Pearl Millet	All Cuttings	When Grass is 36" Tall	6-8
Sorghum Sudangrass	All Cuttings	When Grass is 36" Tall	6-8
Small Grains	First Cutting	Late Boot Stage	3-4
Ryegrass	First Cutting	Late Boot Stage	3-4