

USDA Natural Resource Conservation Service

FORAGE HARVEST MANAGEMENT - Practice Code 511



FORAGE HARVEST MANAGEMENT

The cutting and removal of forages from the field as hay, greenchop, or ensilage.

PRACTICE INFORMATION

This practice applies to all land uses where machine harvested forage crops are grown. It is designed to help the farmer or rancher optimize the economic yield of forage at the desired quality and quantity. In addition, the practice provides the following functions:

1. Promote vigorous plant growth for improved ground cover and protection from erosion
2. Soil improvement provided by healthy vigorous plants that increase soil organic matter, root channels, water holding capacity, earth worms, etc
3. Maintain stand life for the desired time period
4. Maintain desired species composition
5. Use forage plants as a nutrient uptake tool to utilize or reduce excess plant nutrients available in the soil
6. Provide food and cover for wildlife

The following management concepts are considered in the specifications of this practice:

1. Stage of maturity and harvest interval
2. Moisture content for cutting silage/haylage as well as baling as hay
3. Length of cut for silage/haylage
4. Stubble height maintained for plant health and vigor
5. Management considerations that help improve wildlife food and cover
6. Management considerations to help control disease, insects, and weed infestations

Operation and Maintenance:

1. To insure adequate root reserves, allow plants to reach an appropriate height before the first killing frost.
2. When the quantity and quality of the forage decreases to unacceptable levels, stand renovation may be necessary. Manage any weed infestations.
3. Manage grazing to limit damage to the forage crop. This is especially critical during periods when fields are wet and compaction can occur, such as during late winter. Remove livestock from hay fields before plants begin spring growth.
4. Monitor weather conditions accordingly before and after cutting to optimize forage wilting or curing time, maintain forage quality, and prevent forage swaths or windrows from smothering underlying plants.
5. Do not cut forage until dew, rain, or irrigation water on leaves has evaporated.
6. Minimize the time cured forage in the form of bales is allowed to remain drying in the field to prevent smothering of underlying plants.
7. Consider the storage and location of silage to adequately protect it from rainfall and runoff. Integrate any leachate that may occur into the waste storage management system if at all possible.
8. Ensure good compaction and an airtight seal with the storage to exclude oxygen and prevent mold formation. (Do not seal hay as it can result in heat build-up, moisture, and mold problems)
9. Harvest forage in a timely manner so as to maintain the desired composition of plant species, control insects, diseases and weeds while maintaining plant vigor and wildlife habitat over the planned life of the forage stand.

Additional information including standards and specifications are available at your local NRCS Field Office Technical Guide.

Forage Harvest Management – Practice Code 511

Maintenance Life- 10 years

Cooperator _____

511 –Forage Harvest Management for Crops

Farm #	Field #	Acres	Plant Species	Method of Harvest	Number of Cuttings	Growth Stage at Harvest	Optimum Moisture Level	Minimum height at 1 st frost killing

511W-Forage Harvest Management for Wildlife

Farm #	Field #	Acres	Wildlife Concern	Plant Species	Method of Harvest	Minimum height at 1 st frost killing *(6 in)	Delay Harvest Date **(July 1)

Refer to the conservation plan map for the location of Forage Harvest Management for Wildlife

*Recommend height at killing frost is 6 inches to ensure adequate cover for nesting birds.

** Delay harvest till July 1 to ensure young have left the nest. Make sure to follow program guidelines when receiving cost share.

TABLE 1: Forage Harvesting Guidelines for Established Stands ¹

Plant Species	Harvest Period	Growth Stage for Harvest ^{2 3}	Average Number of Cuttings ⁴	Minimum Height at First Killing Frost
LEGUMES				
Alfalfa	st 1 cut.	Late bud to early bloom.	3 – 5	The <u>next to last</u> cutting of legumes each season should be timed to allow at least 45 days of re-growth prior to the first anticipated killing frost. The <u>final cutting</u> of the season can be done just before, or immediately after the first killing frost.
	nd 2 & successive cuts.	Early bloom.		
Birdsfoot Trefoil ⁵	st 1 cut.	Early bloom.	3	
	nd 2 cut.	Mid to late bloom.		
Ladino Clover	All cuts.	Early to mid bloom.	3	
Red or Alsike Clover	st 1 cut.	First bloom to early bloom.	3	
	nd 2 cut +	Late bud to early bloom.		
Annual Lespedeza	All cuts.	Mid to full bloom.	2	
COOL-SEASON GRASSES				
Orchardgrass, Fescue, and other non-jointed grasses	1st cut.	Boot stage.	2 – 3	5 to 6 inches.
	Successive cuts.	After 8 to 10-inch recovery.		
Smooth Brome, Timothy, and other jointed grasses	1st cut.	Smooth Brome – medium to full head; All others – early to full head.	2 – 3	5 to 6 inches.
	Successive cuts.	Wait 6 weeks and cut again. Timothy usually won't produce a second cut until fall.		
WARM-SEASON GRASSES				
Eastern Gama Grass	1st cut.	Late boot stage.	3	8 to 10 inches.
	Successive cuts.	Add N and cut again in 6 – 8 weeks. <u>Caution:</u> leave 8-inch stubble.		
Switchgrass, Big Bluestem	All cuts.	Late boot stage. <u>Caution:</u> leave 4 to 6-inch stubble.	Typically 1 cutting, sometimes 2.	8 inches.
Caucasian Bluestem	All cuts.	Late boot stage. <u>Caution:</u> leave a 3 to 4-inch stubble.	Usually just 1 cutting.	6 inches.
Summer annual grasses (Sudan Grass or Sudan/Sorghum crosses)	All cuts.	Sudangrass: 18-24 inches tall. Sorghum x sudangrass: typically 24 to 30 inches for hay. Delay green-chopping until grass is 18 inches in height or taller to avoid adverse effects of prussic acid. <u>Caution:</u> leave 4 – 6 inch stubble.	2 – 3 (Sorghum only once.)	Frosted forage should not be grazed for at least a week after frost to allow prussic acid content to dissipate.

Forage Harvest Management 511 NRCS – Pennsylvania 2006

TABLE 1 NOTES:

1. For additional hay harvest recommendations, refer to published agronomy guides (e.g., Penn State, Virginia Tech, Ohio State) or other recognized references.
2. Definitions of developmental stages of forage grasses and legumes (Source: The Penn State Agronomy Guide):

Stage of Maturity	Definition*
<i>Legumes</i>	
Late vegetative	No visible buds, flowers or seed pods. Stems at least 12 inches tall.
Early bud	Visible flower buds on at least one stem (1%).
Mid bud	50% of the stems have at least one bud.
Late bud	75% of the stems have at least one bud, no visible flowers.
First bloom	Flowers on at least one stem (1%).
Early bloom	10% of the stems have at least one flower.
Mid bloom	50% of the stems have at least one flower.
Full bloom.	75% of the stems have at least one flower, no visible seed pods.
<i>Grasses</i>	
Vegetative	Leaves only, stems not elongated (specify height).
Stem elongation	Stems elongating. Specify early or late jointing.
Boot	Flowers head is enclosed in a flag leaf sheath and not showing.
Heading	Flower head emerging or emerged from flag leaf sheath, but not shedding pollen.
Anthesis	Flowering stage, anthers shedding pollen.
Milk stage	Seed immature, endosperm milky.
Dough stage	Well-developed seed, endosperm doughy.
Ripe seed	Seed ripe, leaves green to yellow brown.

*Randomly select 100 stems from the field and determine the percentage of stems at the most mature stage of development.

3. Harvesting of legume-grass mixes:

Alfalfa-grass mixes should be cut based on the maturity of the alfalfa, when alfalfa is in late bud to early bloom stage.

All other **legume-grass mixes** should be cut based on grass maturity.

4. The actual number of cuttings per year will depend on temperature, rainfall, and other site-specific conditions.
5. For birdsfoot trefoil, maintain a cutting height of 3 inches or more to maximize yields and the longevity of the stand.

TABLE 2: Optimum Moisture Levels for Storing Forage		
Storage Method	Percent (%) Moisture for:	
	Hay	Corn
Upright or tower, conventional	60 – 65	63 – 68
Upright or tower, oxygen limit	40 – 55	55 – 60
Bunker or horizontal	65 – 70	65 – 70
Bag silo (plastic tube)	50 – 60	65 – 70
Baleage (plastic-wrapped round bale)	50 – 60	N/A
Field-cured hay	15 – 20	N/A
Forced-air dried baled hay	20 – 35	N/A