

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

FORAGE AND BIOMASS PLANTING

(Ac.)

CODE 512

DEFINITION

Establishing adapted and/or compatible species, varieties, or cultivars of herbaceous species suitable for pasture, hay, or biomass production.

PURPOSE

- Improve or maintain livestock nutrition and/or health.
- Provide or increase forage supply during periods of low forage production.
- Reduce soil erosion.
- Improve soil and water quality.
- Produce feedstock for biofuel or energy production.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies on all lands suitable to the establishment of annual, biennial or perennial species for forage or biomass production. This practice does not apply to the establishment of annually planted and harvested food, fiber, or oilseed crops.

CRITERIA

General Criteria Applicable to All Purposes

Plant species and their cultivars shall be selected based upon:

- Climatic conditions, such as annual rainfall, seasonal rainfall patterns, growing season length, humidity levels, temperature extremes and the USDA Plant Hardiness Zones.

- Soil condition and position attributes such as pH, available water holding capacity, aspect, slope, drainage class, fertility level, salinity, depth, flooding and ponding.
- Resistance to disease and insects common to the site or location.
- Plant compatibility with other forage species in their rate of establishment, maturity, and growth habit when seeded together as a forage mixture.

Specified seeding/plant material rates, methods of planting and date of planting shall be consistent with documented guidance cited by research institutions and/or agency demonstration trials for achieving satisfactory establishment.

Seeding rates will be calculated on a pure live seed (PLS) basis.

Do not plant federal, state, or local noxious species.

When planting legumes, use pre-inoculated seed or inoculate with the proper viable strain of Rhizobia immediately before planting.

Planting by conventional or no-till methods are acceptable. Planting methods shall provide a firm weed-free seedbed that ensures good seed to soil contact.

All seed and planting materials shall meet Kentucky quality standards.

Fertilizer and soil amendments shall be based on University of Kentucky lime and fertilizer recommendations. Application shall be appropriately placed and timed to be effective.

Livestock shall be excluded until the plants are well established.

Additional Criteria for Improving or Maintaining Livestock Nutrition and/or Health

Forage species must be capable of meeting minimum daily requirements for the kind and class of the animal being fed or sheltered.

Additional Criteria for Providing or Increasing Forage Supply During Periods of Low Forage Production.

Select plants that will produce forage for use during periods when other on-farm forage does not meet livestock needs. Forage species selected shall help balance the daily nutritional needs of the animals for the desired period of time.

Additional Criteria for Reducing Erosion and Improving Water Quality.

Plants shall provide adequate ground cover, canopy cover, root mass and vegetative retardance to protect soil against erosion.

Additional Criteria for Producing Feedstocks for Biofuel or Energy Production.

Select plants that provide adequate kinds and amount of plant materials needed.

CONSIDERATIONS

In areas frequented by high density of animals, establish persistent species that can tolerate close grazing and trampling.

Where wildlife management is an objective use plant species beneficial to the desired wildlife species. Consider converting between 20 and 30% of the pasture and hayland to native warm season grass. Use an approved habitat evaluation procedure to aid in selecting plant species and providing for other habitat requirements.

PLANS AND SPECIFICATIONS

Specifications for the establishment of pasture and hay planting shall be prepared for each site or management unit according to the Criteria and Considerations described in this standard, and shall be recorded on specification sheets, job sheets, in narrative

statements in the conservation plan, or other acceptable documentation.

GENERAL SPECIFICATIONS

Procedures, technical details and other information listed in this section provides guidance for carrying out the Pasture and Hay planting.

Soil Fertility Requirement

Cool season grasses and legumes apply lime and fertilizer according to University of Kentucky lime and fertilizer recommendations. The per acre soil test requirements for N, P & K may be waived when the soil test calls for a total per acre requirement of less than 25 lbs and/or the total amount of fertilizer to be applied is less than 50 pounds. Lime requirements may be waived when the soil test calls for per acre requirements of less than 2 tons and/or the total amount of lime to be applied is less than 4 tons.

Warm Season Grasses and legumes; the application of lime and fertilizer is not required on warm season grasses during the establishment phase. Based on field experience in Kentucky, the application of fertilizer at or prior to seeding tends to stimulate weed competition. For forage production purposes, after establishment, apply lime and fertilizer according to University of Kentucky lime and fertilizer recommendations.

Seed Bed Preparation

Conventional Tillage: Where erosion is not a concern conventional tillage may be performed to prepare a firm seedbed. The seedbed will be made firm by rolling or cultipacking prior to seeding. The seedbed is firm if you can walk on it without sinking more than ½ inch.

On soils with an EI greater than 8, particular attention to seed bed preparation and/or use of companion crops for protection during the relatively short erosive short establishment period is encouraged.

Mulch Tillage & No-till: Where erosion is of primary concern no-till establishment procedure should be used. When using any reduced tillage system a burndown herbicide application is required to reduce weed competition.

A winter annual small grain should be used as a companion or nurse crop where erosion is a major concern and the seeding will be performed later than the optimum planting dates.

Approved Forage Species

Forage species shall be used that best address the resource concerns and meet clients plan objectives selected from **Table 1–KY Forage Use and suitability guide**. A specie or use will not be recommended for use with a rating of P= Poor.

Species Selection and Site Suitability

Select combinations of plant species that are adapted to site conditions. Adaptation is based on KY FOTG Section II – K-1 Soils Information Pasture and Hayland Suitability groups. For guidance in determining species suitability refer to **TABLE 1 – KY Use and suitability guide**.

Droughty and Severely Eroded Soils:

Pasture and Hayland Suitability Groups 6, 8, 9, 10, 13 & 14

Moderately Well to Well Drained Soils:

Pasture and Hayland Suitability Groups 1, 5, 7 & 11

Somewhat Poorly to Poorly Drained Soils:

Pasture and Hayland Suitability Groups 2, 3, 4, & 12

Seeding Rates

Seeding rates are based on the optimum amount of seed necessary to provide vegetative cover in a reasonable amount of time. The seeding rates for pure and mixed stands may be developed from **Table 2 KY Seeding rates for Pasture and Hayland planting**.

Seeding Dates

Seeding dates vary slightly in Kentucky from North to South due to latitude and West to East based on elevation and weather patterns. The following dates are based on weather records averaging 50 percent probability that

temperatures will fall to 32 degrees in spring and fall.

Cool-Season Grasses and Legumes:

Western & Southern KY – MLRA 120, 122, 131, & 134

Optimum: 02/15 – 03/15 & 08/20 – 09/20

Acceptable: 02/01 -- 04/15 & 08/10 -- 10/01

Dormant: 01/01 – 03/01 (Legumes only)

Cool-Season Grasses and Legumes:

Northern & Eastern KY – MLRA 121, 124, 125, & 126

Optimum: 02/15 -- 03/15 & 08/20 – 09/20

Acceptable: 02/01 – 05/01 & 08/01 -- 10/01

Dormant: 12/15 -- 03/15 (Legumes only)

Warm Season grasses:

Western & Southern KY – MLRA 120, 122,131, & 134

Optimum: 04/15 -- 05/15

Acceptable: 04/01 -- 06/30

Dormant: 12/15 -- 02/15 (Eastern Gama only)

Warm Season grasses:

Northern & Eastern KY – MLRA 121, 124, 125, & 126

Optimum: 04/15 -- 06/1

Acceptable: 04/15 -- 06/30

Dormant: 11/15 -- 03/01 (Eastern Gama only)

Weed Control during establishment

Weed control during the establishment year shall be performed to ensure survival of the new seeding. Weed control will be addressed according to Integrated Pest Management (595) standard and specifications.

To manage severe weed competition, warm season grass species may be mowed no closer than 8 inches and cool season grasses/legumes species not closer than 4 inches. Mowing will both reduce weed canopy and stimulate grasses to tiller resulting in improved forage stand.

Approved herbicides may be used on both cool and warm season grass planting to control weed species. Read and follow label carefully to assure that all grass and legumes species are resistant to selected herbicide.

Lacefield, G.D. and Smith, S.R., University of Kentucky Department of Agronomy publication AGR-26 "Renovating Hay and Pasture Fields"

University of Kentucky Department of Agronomy publication 172 Weed Management in Grass Pastures, Hayfields, and Fence rows.

OPERATION AND MAINTENANCE

The operator will inspect and calibrate equipment prior to use to insure proper rate, distribution and depth of planting material.

Invasion by undesirable plants shall be controlled by mowing and/or using a selective herbicide according to Label.

Insects and diseases shall be controlled when an infestation threatens stand survival.

Evaluate forage stands each season or as needed to determine management inputs needed to achieve the desired purpose(s). As the percentage legumes declines in pastures and hayfields, consider pasture renovation following the guidance in extension publication AGR-26 "Renovating Hay and Pasture Fields."

Prescribed Grazing (528A), Forage Harvest Management(511), Nutrient Management 590), and Pest Management (590) as appropriate will be planned to protect and achieve the intended life span of the seeding practice.

REFERENCES

Ball, D.M., C.S. Hoveland, and G.D. Lacefield, Southern Forages, Third Edition. Potash and Phosphate Institute, Norcross, GA.

University of Kentucky Department of Agronomy publications: AGR-1 Lime & Fertilizer recommendations for Field Crops.

University of Kentucky Department of Agronomy Publication AGR-18 Grain and Forage Crop Guide for Kentucky.

University of Kentucky Department of Agronomy Publication AGR-145 Warm Season Perennial Grasses for Forage in Kentucky.

TABLE 1. KY Forage Use and Suitability Guide (E= Excellent, G= Good, F=fair, P=poor).

Forage Species	Plant Type	Use Suitability			Site Suitability		
		Continuous Grazing	Prescribed Grazing	Hayland	Droughty and/or	Mod to Well	Somewhat to Poorly
Grasses – Cool Season Introduced Species							
KY Bluegrass 1/	Perennial	F	G	P	P	G	P
Orchardgrass	Perennial	F	E	E	F	E	F
Redtop	Short lived Perennial	P	F	F	F	G	P
Tall Fescue	Perennial	G-E	E	G	G	E	G
Timothy	Perennial	P	G	E	P	G	P
Legmues							
Alfalfa	Perennial	P	G	E	F	E	P
Alsike Clover	Short lived Perennial	P	F	F	P	F	G
Annual Lespedeza 2/	Perennial	F	G	F	F	G	F
Ladino Clover	Perennial	F	G	E	F	G	F
Red Clover	Short lived Perennial	F	G	E	F	G	F
White Clover (common)	Perennial	F	G	F	F	G	F
Warm Season Grasses							
Bermudagrass	Perennial	G	E	G	F	G	F
Big Bluestem	Perennial	P	G	F	G	G	P
Eastern Gama Grass	Perennial	P	G	F	G	G	E
Indiangrass	Perennial	P	G	F	G	G	P
Switchgrass	Perennial	P	G	F	G	G	F
Annual Forages & Companion Species							
Annual Ryegrass	Winter Annual	F	G	G	G	G	F
Millet (Pearl)	Summer Annual	F	F	G	F	G	F
Sorghum/Sudangrass	Summer Annual	F	F	G	F	G	F
Small grains 4/	Winter Annual	F	F	G	G	G	F
1/ Applicable to MLRA 121 & 124 2/ Kobe and/or Korean 3/ Applicable to MLRA 120, 122, 131 & 134 4/ Barley, rye or wheat							

Table2. KY Seeding Rates for Forage and Biomass Planting. Mixtures of introduced grasses must include a minimum of ten (10) pounds grass per acre. Mixtures of native grasses must include a minimum of eight (8) pounds PLS.

Forage Species	Single Species Seeding Rate Minimum lbs/ac	Multiple Species Seeding Rate Minimum lbs/ac	Optimum Seeding Dates	
			Spring	Fall
GRASSES – Cool Season Introduces Species				
Ky Bluegrass	15	10	2/15-3/15	8/20 - 9/20
Orchardgrass	15	10	2/15-3/15	8/20 - 9/20
Redtop	8	4	2/15-3/15	8/20 - 9/20
Tall Fescue	25	15	2/15-3/15	8/20 - 9/20
Timothy	10	5	2/15-3/15	8/20 - 9/20
Legumes				
Alfalfa	20	15	2/15-3/15	8/20- 9/20
Alsike Clover	4	2	2/15-3/15	8/20- 9/20
Annual Lespedeza	10	5	2/15-3/15	
Ladino Clover	3	1	2/15-3/15	8/20- 9/20
Red Clover	10	5	2/15-3/15	8/20- 9/20
White Clover	3	1	2/15-3/15	8/20 - 9/20
Warm Season Grasses				
Bermudagrass	40 bu/ac	n/a	4/14-5/15	
Big Bluestem	8	2	4/15-6/01	
Eastern Gama Grass	8	3	4/15-6/01	
Indiangrass	8	2	4/15-6/01	
Switchgrass	8	1	4/15-6/01	
<i>(Switchgrass for biomass)</i>	6	n/a	4/15-6/01	
Annual Forages				
Annual Ryegrass	30	15	2/15-3/15	8/20 - 9/20
Millet, (Pearl)	30	n/a	4/15-5/15	
Sorghum-Sudangrass	30	n/a	4/15-5/15	
Small Grains	90	30	9/20-10/10	
<p>Bold dates indicates primary Optimum seeding dates See 512 page 3 for acceptable and dormant seeding dates. * When wildlife is a primary concern and erosion is moderate/slight risk all seeding rates for grasses may be reduced by 50%.</p>				