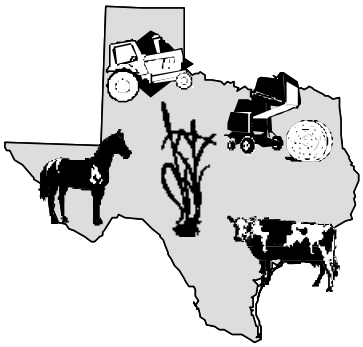

SCS-2003-01

FORAGES

Establishment & Early Persistance of Seeded Warm-Season Grasses

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The chance of successfully establishing grass pastures from seed may be improved by following a few basic recommendations. Since it is impossible to control rainfall (unless there is irrigation), stand establishment must be improved by other means. Matching the best species or cultivar to the best seedbed conditions at the best time of the year will favor seedling germination, growth and, eventually, establishment.

Site Selection

Select the site or pasture the year prior to planting and control all perennial grasses and broadleaf weeds prior to establishment. This can be accomplished by either disking or chemical (herbicide) control, especially if noxious plants are present. If possible, select deep-fertile soils with higher yield potential for more productive species and the shallow sites for the shorter grasses with lower yield potential. Match the soil type to the species that is best adapted to that site. For example, bermudagrass is better adapted to sandy soils, while switchgrass is more tolerant of wetter sites.

Fertility

Take a soil sample at least six months prior to planting to determine fertility requirements and if limestone will be needed. If the soil pH is below 5.8, it should be limed according to the soil test based on effective calcium carbonate equivalence (ECCE). If dry limestone is used, it should be added approximately 6 months prior to establishment to allow time for it to react in the soil, whereas superfine limestone should be added 2-3 months prior to planting. If liquid lime is to be used, it can be applied at the time of planting because it will react much faster in the soil due to its smaller particle size. Having the correct pH will ensure that soil nutrients are available to the plant rather than bound to soil particles.

Should the soil test indicated the need for additional phosphorus (P) and potassium (K), they should be incorporated at or immediately prior to planting, because they (especially P) are not mobile in the soil (hence the need for incorporation). If P and K levels are high at the time of establishment and the grass is grazed, there should be enough recycling of P and K through the manure and urine that additional P and K should not be needed for a few years. If the pasture is cut for hay, however, it is critical that the field be soil tested regularly to monitor nutrient status. Hay pastures are typically mined of their nutrients and grass stands gradually decline over time.

Nitrogen (N) should not be applied until the seedlings are well established since N applied too early will only favor weeds, especially grassy weeds. Although N will be needed every season to increase total forage production, most native grasses do not respond as well to high N rates as introduced species such as hybrid bermudagrass. The exception to this general rule is the tall grasses (e.g. switchgrass and eastern gamagrass), because they typically grow in areas with greater rainfall. Therefore, most native grasses should not receive more than 50 units of N per year. Since N is susceptible

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to leaching, split-applications over the growing season may improve fertilizer efficiency. The best way to determine fertility requirement is to write the forage species and management system (e.g. hay, grazing, or wildlife) on the soil sample bag and follow the Texas A&M Soil Testing Laboratory fertility recommendation.

Species or Cultivar Selection

Select the species that is best adapted to your specific environment (site, soils, climate, management, etc.) (Table 1). The best form of weed control is a solid stand of desirable grasses with a closed canopy. If the species is not adapted, weeds will choke it out, even when all the management practices are done correctly.

Most native bunchgrasses that are relatively productive are considered tall-grass plants (e.g. Indiangrass, big bluestem, switchgrass, and eastern gamagrass). Tall grasses differ from mid- (e.g. little bluestem and sideoats grama) and short-grasses (e.g. buffalograss) in that they require more leaf area to maintain an adequate level of photosynthesis. It is, therefore, critical that these plants not be cut/grazed below 6 inches or they will weaken and not persist. Sod-forming plants that are low growing, maintaining leaf area very close to the ground (e.g. bermudagrass or bahiagrass) can be cut/grazed at 1-2 inch height and still persist.

Introduced grasses (e.g. kleingrass, Old World bluestems, and bermudagrass) are generally grown in monocultures and have been selected for greater productivity under higher levels of fertility and proper management. Grasses that are grown in a monoculture are generally easier to manage and harvest seed from, which is why seed cost of introduced grasses is generally less than for native grasses. Introduced grasses generally have less seed dormancy so that most seeds germinate when conditions are favorable. This equates to more reliable and uniform establishment.

Table 1. Seeding rates, relative cost, and production range of various seeded grasses.

	Planting Rate Lbs. PLS/A March-May	Soil Type*	Estimated Seed Cost $/A	Estimated Production Lb./A	Vegetation Regions**
Native					
Big bluestem	6.0	s.l. or c.l.	72	4,000 - 6,000	1 - 6
Little bluestem	3.5	s.l. or c.l.	40	2,500 - 3,000	3 - 9
Eastern gammagrass	10.0	loam	80	6,000 - 8,000	1 - 8
Indiangrass	4.5	s.l. or c.l.	45	4,000 - 5,000	1 - 6
Sideoats grama	4.5	s.l. or c.l.	65	2,500 - 3,000	3 - 9
Switchgrass	2.0	s.l. or c.l.	16	5,000 - 8,000	1 - 8
Introducted					
Bahiagrass	20	s.l.	20	3,000 - 6,000	1 - 3
Buffelgrass	3.5 hulled 12.0 unhulled	s.l. or c.l.	70	5,000 - 8,000	6 - 7
Common bermudagrass	8.0	s.l.	20	6,000 - 8,000	1 - 8
Dallisgrass	15	c.l.	25	3,000 - 6,000	1 - 4
Giant bermudagrass	8.0	s.l.	30	7,000 - 9,000	3 - 5
Johnsongrass	25	s.l. or c.l.	30	5,000 - 8,000	1 - 9
Kleingrass	2.0	s.l. or c.l.	12	4,000 - 6,000	3 - 8
Lovegrass	2.0	s.l.	15	3,500 - 8,000	5 - 9
Old World bluestem	2.0	s.l. or c.l.	30	5,000 - 8,000	3 - 8

* s.l. = sandy loam, c.l. = clay loam

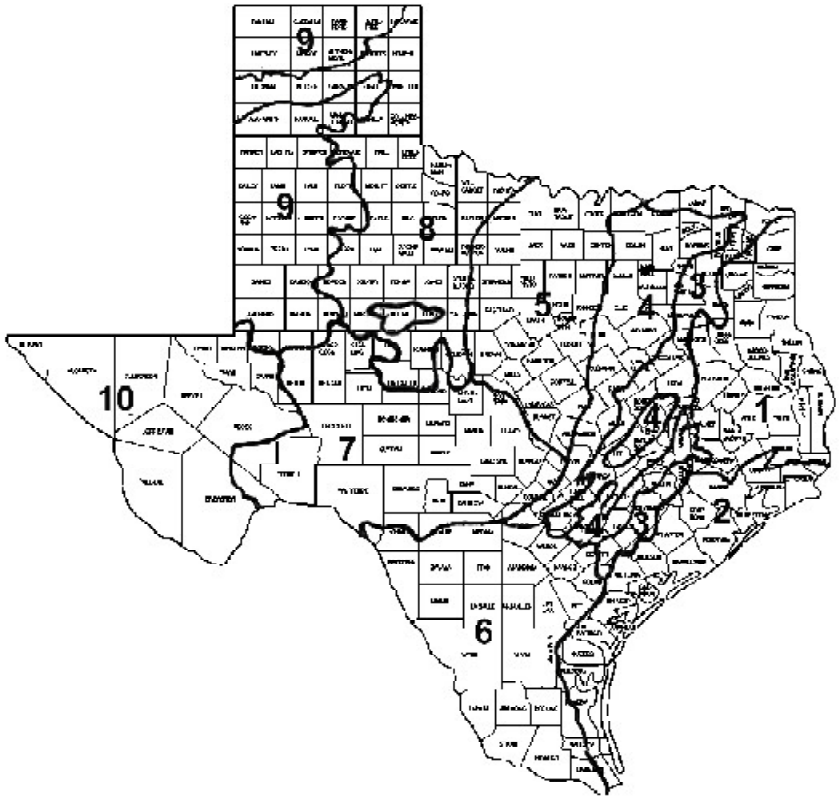

Figure 1. Regions adopted from Gould, 1962. (1 = Pineywoods; 2 = Gulf Prairies; 3 = Post Oak Savannah; 4 = Blackland Prairies; 5 = Cross Timber and Prairies; 6 = South Texas Plains; 7 = Edwards Plateau; 8 = Rolling Plains; 9 = High Plains; and 10 = Trans Pecos).

Establishment Methods

Drilling seed into the soil is usually the most effective seeding method since depth and spacing are ideal. Most grasses cannot emerge through more than ¼ inch of soil, so care should be taken not to bury seed too deeply. Drilling, however, is not always feasible. If seed is broadcast on the surface, a firm, clean-tilled seedbed will improve germination while rolling will ensure good seed-soil contact. Alternatively, the seed can be applied through fertilizer and then trampled in by cattle or no-tilled into sod that has been previously killed chemically (e.g. glyphosate, a non-selective herbicide). One advantage to no-tilling is that planting can be delayed until after spraying newly emerged weeds so weed competition is minimized due to reduced soil disturbance.

It is important to plant as early in the growing season as moisture and temperature allow, thereby giving plants sufficient time to grow and develop. This lengthens the growing season, improves root development and increases the chances of survival through the first winter. Planting too early, however, when the temperatures are too low (or when a late freeze occurs) can destroy or cripple establishing seedlings. Plant late enough to avoid low temperatures and early enough to take advantage of spring rains for good seedling establishment.

Weed Control

Cimarron (a.k.a. Ally) is labeled for the establishment of native and certain introduced (Old world bluestem, kleingrass, and lovegrass) seeded grasses in Conservation Reserve Program (CRP) land at 0.10 oz./A for the control of annual broadleaf weeds (2-3 inches tall). The hormone herbicides (2,4-D, Weedmaster, Grazon P+D, etc.) have some pre-emergent activity on seeded grasses, and should **NOT** be used during establishment. The label states "do not use for at least 60 days prior to establishment". After seedlings are approximately 60 days old or in the 5th leaf stage, they are considered to be established so that all pasture herbicides (Amber, 2,4-D, Weedmaster, Grazon P+D, etc.) can be safely used to control broadleaf weeds, if there is no environmental stress.

Plateau was recently labeled (Jan. 2002) for the establishment of certain native grasses (Indiangrass, little bluestem, big bluestem, and sideoats grama) either pre-plant or once these grasses have reached the 5th leaf stage. Plateau controls many annual grassy weeds when applied at 2-6 oz./A. Initial tests in Texas indicate that these native grasses when mature, are tolerant to Plateau herbicide. However Plateau applied as a pre-plant in Texas has shown to be safe on certain natives (bluestems, and Indiangrass), while damaging other natives (sideoats grama and switchgrass) and all introduced species tested (giant bermudagrass, kleingrass, Old World bluestems, and Wilman lovegrass) (Table 2).

Traditionally, suppression of annual grassy weeds can be accomplished by mob-grazing. Mob-grazing (also called flash-grazing) occurs when there is a high stock density for a very short period of time. It works the same as mowing, but does not leave a thick thatch that shades out new seedlings. It is important to delay grazing until the desirable seedlings are well established to avoid uprooting or damage due to trampling.

Management After Establishment

It is important to defer grazing the first year to allow young plants to fully develop root systems. Once fully established, tall grasses that require more leaf area to maintain photosynthesis tend to persist longer under rotational grazing or haying systems, which allow plants time to recover between harvests. A late season rest (August-September) is much more beneficial than either an early season or dormant rest, because this is the time that the plants send carbohydrates down to the root system and set seed. Plants that have vigorous root systems will be more productive the following season and will be better able to compete with weeds.

Summary

Site selection, proper soil fertility, and species selection are important factors to consider prior to establishing warm-season perennial grasses. Proper selection will maximize chances of successful establishment. Management and environmental conditions after planting are the most critical factors determining whether or not you will get a successful stand. Often, environment cannot be controlled (lack of rain), which will cause a failure to get a stand even when all things are done correctly. However, by creating a favorable environment for new seedlings (i.e. ensuring good seed-soil contact, controlling the weeds and deferred grazing) will maximize the chances of seedling survival and successful establishment.

Table 2. Tolerance of ten seeded grasses to three herbicides applied at two timings in Stephenville during the 2002 growing season

		NATIVE GRASSES									
		Big bluestem		Indiangrass		Sideoats grama		Sand bluestem		Switchgrass	
Herbicide Treatment	Timing***	Height in.*	% Injury**	Height in.	% Injury	Height in.	% Injury	Height in.	% Injury	Height in.	% Injury
No Herbicide		10				4	11		13		
2 oz. Plateau	Pre-plant	8	15	5	0	1	90	8	15	0.25	95
2 oz. Plateau	2 - 3 leaf	10	10	5	10	4	10	10	5	2	80
0.15 oz. Cimarron	Pre-emergent	6	15	0	99	3	10	6	20	5	50
0.15 oz. Cimarron	2 - 3 leaf	9	0	5	0	4	0	8	0	9	0

		INTRODUCED GRASSES									
		Giant bermudagrass		Kleingrass		Old World Bluestem W. W. Spar		Old World Bluestem W. W. B-Dahl		Wilman lovegrass	
Herbicide Treatment	Timing	Height in.	% Injury	Height in.	% Injury	Height in.	% Injury	Height in.	% Injury	Height in.	% Injury
No Herbicide		20		24		22		10		30	
2 oz. Plateau	Pre-plant	0	99	0	99	0	99	0	99	0	99
2 oz. Plateau	2 - 3 leaf	0	99	0	99	0.5	99	0.25	99	1	50
0.15 oz. Cimarron	Pre-emergent	16	25	15	50	0	99	6	15	22	25
0.15 oz. Cimarron	2 - 3 leaf	19	0	25	0	21	0	9	0	24	0

* Plant heights were taken 60 DAP (days after planting)

** % visual injury ratings were taken 30 DAT (days after treatment)

*** Plateau pre-plant treatments were applied one day prior to planting, while pre-emergent treatments were applied one day after planting.

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