

Appendix 1 - Planting rates for seeding and sprigging in Texas, Zone 4

Name	Variety / Cultivar	Broadcast seeding rates are pounds pure live seed (PLS) per acre 3/, 5/, 6/	Southern Counties ONLY	Northern Counties ONLY	Entire Zone 4	Native (N) or Introduced (I)	Season of growth	Adaptation by Major Land Resource Areas							Seeding Guidance Soil 9/				Comments 10/			
								86A	86B	87A	87B	133B	150B 11/	152B	Seeding Dates 7/, 8/	Coarse	Moderately Coarse	Medium		Moderately Fine	Fine	
PERENNIAL GRASSES 1/, 4/ Bahia grass	Pensacola, Tifton 9	12.0 - 15.0				X I	W	X	X	X	X	X	X	X	X	10/1 - 6/1		X	X	X	X	Best adapted to the high rainfall areas of East Texas and the Coast Prairie. Adapted to a wide variety of soils with pH of 5.5 - 7.0; not recommended on soils with pH > 7.0, or soils with > 40" of sand at the surface unless in areas of >55" annual rainfall. It performs better than coastal bermudagrass on wet soils, but is not as drought tolerant as coastal.
Bahia grass	Argentine	12.0 - 15.0	X			I	W	X	X	X	X	X	X	X	X	9/1 - 6/1		X	X	X	X	Same as above; however, Argentine is more susceptible to ergot.
Seeded Bermudagrass	common; hulled	2.3 - 6.0				X I	W	X	X	X	X	X	X	X	X	2/15 - 6/1 3/1 - 6/1 8/15 - 9/30		X	X	X	X	Best adapted to well and moderately well drained soils, optimum pH 5.5 - 8.0. Not recommended on deep or very deep sands, or areas flooded for long duration. Less drought tolerant than hybrid bermudagrass.
Seeded Bermudagrass	common; unhulled	3.0 - 8.0				X I	W	X	X	X	X	X	X	X	X	2/15 - 6/1 3/1 - 6/1 8/15 - 9/30		X	X	X	X	Same as above
Seeded Bermudagrass	Cheyenne	3.0 - 8.0	X													2/15 - 6/1 8/15 - 9/30		X	X	X	X	Released in 1989 for turf and reclamation, adapted to moderate to well drained soils in the SE and Gulf Coast. Has produced lower yields than other seeded varieties in variety trials at Overton, TX.
Seeded Bermudagrass	Giant	3.0 - 8.0				X I	W	X	X	X	X	X	X	X	X	2/15 - 6/1 3/1 - 6/1 8/15 - 9/30		X	X	X	X	Adaptation similar to common, wider leaves, slightly higher productivity than common. Stands have tended to thin out over time.
Seeded Bermudagrass	Guyman	3.0 - 8.0				X I	W	X		X	X	X	X	X	X	3/1 - 6/1		X	X	X	X	Soil adaptation similar to common. Cold tolerance similar to Tifton 44.
Seeded Bermudagrass	Ranchero Frio	3.0 - 8.0	X			I	W	X	X		X	X	X	X	X	2/15 - 6/1 8/15 - 9/30		X	X	X	X	Mixture of Cheyenne and giant. Adaptation same as common. Produced less than Texas Tough and Tierra Verde in variety trials at Overton, TX.

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PERENNIAL GRASSES 1/, 4/ Seeded Bermudagrass	Texas Tough	3.0 - 8.0				X I	W	X	X	X	X	X	X	X	X							Mixture of common hulled, common unhulled, and giant bermudagrass. Adaptation same as common. Most productive seeded variety in 3 year trial at Overton, TX.
Seeded Bermudagrass	Tierra Verde	3.0 - 8.0				X I	W	X	X	X	X	X	X	X	X							Similar mixture to Texas Tough. Adaptation same as common. Production slightly less than Texas Tough in Overton variety trials.
Hybrid Bermudagrass 2/	Alicia	w/ sprigging machine 12 - 20 Bu/ac 15 - 25 cu.ft. broadcast 24 - 40 Bu/ac 30 - 50 cu.ft.				X I	W	X	X	X	X	X	X	X	X							Adaptation similar to coastal, but less winter hardy and recovers slower than coastal after severe winter. Yield is usually less than coastal. Good for erosion control, provides quicker cover than coastal, but forage is usually lower in quality than coastal. Somewhat susceptible to rust.
Hybrid Bermudagrass 2/	Brazos	w/ sprigging machine 12 - 20 Bu/ac 15 - 25 cu.ft. broadcast 24 - 40 Bu/ac 30 - 50 cu.ft.				X I	W	X	X	X	X	X	X	X	X							Production is similar to higher than coastal on adapted soils. Cold tolerance similar to coastal. Usually higher digestibility than coastal.
Hybrid Bermudagrass 2/	Coastal	w/ sprigging machine 12 - 20 Bu/ac 15 - 25 cu.ft. broadcast 24 - 40 Bu/ac 30 - 50 cu.ft.				X I	W	X	X	X	X	X	X	X	X							Best adapted to moderately to well drained sandy to loamy soils, but will persist on clayey soils. Moderate cold tolerance.
Hybrid Bermudagrass 2/	Coastcross -1 and Tifton 68	w/ sprigging machine 12 - 20 Bu/ac (15 - 25 cu.ft.) broadcast 24 - 40 Bu/ac (30 - 50 cu.ft.)	X			I	W		X	X		X	X	X	X							Soil adaptation same as coastal, but both lack cold tolerance, which limits their use to coastal areas of Texas. Both have good disease resistance and produce higher quality forage than coastal. Coastcross primarily spreads by above ground stolons, only occasionally produces rhizomes. Tifton 68 only produces stolons.

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PERENNIAL GRASSES 1/, 4/ Hybrid Bermudagrass Propagated by tops 2/	Alicia, Jiggs, Tifton 85	5 -7 bales				X I	W	X	X	X	X	X	X	X	X	X	5/15 - 6/1 5/30 - 6/15 8/15 - 9/15	X	X	X	X	X	Mature tops are not usually available until the end of May. They must be planted into moist soils and packed immediately after planting.
Bermudagrass	Sod Mulch	260 cubic yd/ac				X I	W	X	X	X	X	X	X	X	X	X	Year round	X	X	X	X	X	Bermudagrass sprigs and stolons scraped up with topsoil and spread and packed to a thickness of 2 inches. Usually used on disturbed sites that would be hard to get seed or sprigs established.
Bluestem, little	Aldous, Cimarron, Native mix	3.4				X N	W	X	X	X	X	X	X	X	X	X	2/15 - 5/1 3/1 - 5/15	X	X	X	X	X	Aldous and Cimarron are best adapted to all upland soils in the Claypan and Southern Blackland areas of Texas. Pollinator habitat.
Bluestem, big	Earl, Kaw, local harvest	6.0				X N	W	X	X	X	X	X	X	X	X	X	2/15 - 5/1 3/1 - 5/15		X	X	X		Best adapted to deep loamy fertile upland sites receiving at least 25" of rainfall annually. Pollinator habitat.
Bluestem, yellow	K.R., T-587	1.2 - 2.0				X I	W	X	X	X	X	X	X	X	X	X	2/15 - 5/1 3/1 - 5/15		X	X	X	X	Best adapted to moderately to well drained loamy to clayey soils with 20 inches or more annual rainfall. O.W. T-587 will freeze out north of the Red River. Optimum pH 5.5 - 7.5. K.R. not recommended in 133B or 152B.
Bluestem, yellow	Medio	1.0 - 2.0				X I	W	X	X								2/15 - 5/1 3/1 - 5/15			X	X	X	Same comments as K.R.
Bluestem, yellow	Plains, WW Spar	1.8 - 2.0			X	I	W	X		X	X	X	X	X	X	X	3/1 - 5/15		X	X	X	X	Best adapted to loamy soils in the northern half of Texas in areas that receive 18 or more inches of annual precipitation. Optimum pH 5.5 - 7.5.
Bluestem, yellow	WW B. Dahl	1.2 - 2.0			X	I	W	X		X	X	X	X	X	X	X	3/1 - 5/15		X	X	X	X	Range same as WW Spar. Soil adaptation well to moderately well drained sandy loam to clay loam, <u>not</u> adapted to alkaline soils or wet sites. Stays vegetative longer than other O.W. bluestems.
Bluestem, yellow	WW Ironmaster	1.8 - 2.0			X	I	W	X		X	X	X	X	X	X	X	3/1 - 5/15		X	X	X	X	Same range as WW Spar, but should only be used on calcareous soils deficient in Fe.
Buffalograss: burs	Texoka	8.0				X N	W	X	X	X	X	X	X	X	X	X	2/15 - 5/1 3/1 - 5/15			X	X	X	Primarily used in bottomland locations.
Buffalograss: dehulled		3.0				X N	W	X	X	X	X	X	X	X	X	X	2/15 - 5/1 3/1 - 5/15			X	X	X	Primarily used in bottomland locations.

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PERENNIAL GRASSES 1/, 4/ Bristlegrass: Plains	Kika 648 Germplasm	2	X			N	W																		Planted only in a mix with streambed bristlegrass, mix is available commercially as Catrina Blend; Plant 1/8 to 1/4 inch dee
Bristlegrass:Streambed	Kika 677 Germplasm, Kika 819 Germplasm, Kika 820 Germplasm	3	X			N	W																		Planted only in a mix with streambed bristlegrass, mix is available commercially as Catrina Blend; Plant 1/8 to 1/4 inch dee
Dallisgrass		15.0				X	I	W	X	X	X	X	X	X	X										Best adapted to moist fertile loamy to clayey soils, primarily bottomlands in east Texas and Gulf Coast. Ergot can be a problem.
Dropseed: sand	Borden County Germplasm	1				X	N	W	X																Plant no deeper than 1/8 " deep on fixe texture soil, no deeper than 1/2" deep on course textured soil
Eastern gamagrass	Jackson	10.0				X	N	W	X	X	X	X	X	X	X										Adapted to most soils in areas of Texas that receive more than 25 inches of rainfall. Not recommended on deep or very deep sandy soils. Pollinator habitat.
Eastern gamagrass	Local harvest	20.0				X	N	W	X	X	X	X	X	X	X										Adapted to moist well to moderately well drained loamy to clayey sites throughout Texas except for the South Texas Plains.
False Rhodesgrass	Kinney Germplasm	1	X			N	W																		Plant 1/8 to 1/4 inch deep, planting too shallow is better than too dee
Florida paspalum	Harrison, common	6 to 8				X	N	W	X	X	X	X	X	X	X										Quail, dove and turkey eat large seed, pollinator habitat , seed very expensive and hard to find. May be best to start a small area and hand harvest for seed for other plantings.
Gramma: Hairy	Chaparral Germplasm	2	X			N	W																		Plant no deeper than 1/4 inch
Gramma: Slender	Dilley Germplasm	8	X			N	W																		Plant no deeper than 1/4 inch

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PERENNIAL GRASSES 1/, 4/ Purpletop Tridens, <i>Tridens flavus</i>	common	2 to 6				X	N	W	X	X	X	X	X	X	X	X	2/15 - 5/1 3/1 - 5/15	X	X	X	X	X	Pollinator habitat
Switchgrass	Alamo	2.0				X	N	W	X	X	X	X	X	X	X	X	2/15 - 5/1 3/1 - 5/15		X	X	X	X	Adapted to most soils in areas of Texas receiving at least 25 inches of precipitation annually. Tolerates poor drainage.
Switchgrass	Local harvest	3.5				X	N	W	X		X	X	X	X	X	X	2/15 - 5/1 3/1 - 5/15		X	X	X	X	Same as above
Velvet rosettegrass	Pilgrim Germplasm	3				X	N	W					X				12/1 - 6/1	X	X	X			Plant no deeper than 1/2 inch
Wildrye: Canada, <i>Elymus canadensis</i>	Lavaca Select Germplasm, Common, Local Ecotype	12				X	N	C	X	X	X	X	X	X	X	X	9/1 - 10/15	X	X	X	X	X	Best suited to uplands. Should be planted 1/4 to 1/2 inches. Suitable to be included in pollinator habitat .
Wildrye: Virginia, <i>Elymus virginicus</i>	Omaha, Kinchaffoonee Germplasm, Common, Local Ecotype	12				X	N	C	X	X	X	X	X	X	X	X	9/1 - 10/15		X	X	X	X	Best suited to bottomlands. Should be planted 1/4 to 1/2 inches. Suitable to be included in pollinator habitat .
Windmillgrass: shortspike	Welder Germplasm	0.5	X				N	W					X				2/1 - 5/1; 9/1 - 11/1	X	X	X	X	X	Plant 1/8 to 1/4 inch deep, planting too shallow is better than too deep
Windmillgrass: shortspike	Mariah Germplasm	0.7	X				N	W					X				2/1 - 5/1; 9/1 - 11/2	X	X	X	X	X	Plant 1/8 to 1/4 inch deep, planting too shallow is better than too deep

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PERENNIAL GRASSES 1/, 4/ Fescue, Tall	Kentucky 31, other adapted endophyte infected varieties	10.0				X I	C													Best adapted to bottomland soils and marginally adapted clay, clay loam and loamy upland sites in areas of East Texas that receive at least 40 inches of rainfall annually. It should be allowed to reseed every year to help insure persistence. Tolerates low pH and poorly drained soils.	
Fescue, Tall	AU Triumph, Jesup, and other adapted edophyte free varieies	25.0				X I	C													Same as above. Jesup can tolerate summer heat better than other endophyte free varieies.	
Perennial Legumes and Forbs:	Alfalfa	10.0 - 20.0				X I	C	X	X	X	X	X	X		8/15 -10/1		X	X	X	Moderately deep to deep, loamy, well drained soils pH 6.5 or greater with good infiltration and water holding capacity.	
Black-eyed Susan, <i>Rudbeckia hirta</i>	common	1 to 2				X N	W	X	X	X	X	X	X	X	9/15 - 5/1		X	X	X	X	Pollinator habitat, bloom June to October
Butterfly milkweed, <i>Asclepias tuberosa</i>	common	8				X N	W	X	X	X	X	X	X		2/15 - 5/1 3/15 - 5/15		X	X	X	X	Pollinator habitat, bloom May to September , seed very expensive, not more than 1 to 2 % of mix.
Compass plant, <i>Silphium laciniatum</i>	common	8				X N	W	X	X	X	X	X			2/15 - 5/1 3/15 - 5/15			X	X	X	Pollinator habitat, bloom May to September , seed very expensive, not more than 1 to 2 % of mix.
Engelmann daisy		15.0				X N	C	X	X	X		X	X	9/15 - 11/30			X	X	X	X	Adapted to loamy to clayey upland soils throughout Texas, except extreme eastern TX. Bloom April to June
Illinois bundleflower	Sabine, common	5.0				X N	W	X	X	X	X	X	X		2/15 - 5/1 3/15 - 5/15		X	X	X	X	Adapted to most upland and bottomland soils in areas receiving at least 15 inches of rainfall annually. Bloom period July to August.
Maximilian sunflower	Aztec	3.0				X N	W	X	X	X	X	X	X		2/15 - 5/1 3/15 - 5/15		X	X	X	X	Adapted to a variety of soils, favors well drained sunny sites receiving at least 18 inches of rainfall annually. Bloom period August to September.

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Perennial Legumes and Forbs: Prairie acacia	Plains Germplasm	5				X N	W	X	X	X	X	X						2/15 - 5/1 3/15 - 5/15	X	X	X	X	X	Tough subshrub. Plant 1/2 to 3/4 inch deep with the proper inoculant. Pollinator habitat, bloom June to November.		
Prairie clover, purple		3.0				X N	W	X	X	X	X							2/15 - 5/1 3/15 - 5/15		X	X	X	X	Grows well on high pH Blackland soils. Can cause bloat. Bloom period June to July.		
Prairie clover, white		2.0				X N	W	X	X	X	X		X					2/15 - 5/1 3/15 - 5/15			X	X	X	Grows well on high pH Blackland soils. Can cause bloat. Bloom period June to July.		
Perennial peanut	Florigraze, Arkbrook	40 - 60 bu sprigs	X				I	W				X	X					1/15 - 3/15		X	X			Best adapted to well drained sandy to loamy soils with pH between 5.0 and 7.5. Moderate cold tolerance.		
Showy goldenrod, <i>Solidago speciosa</i>	common	1.0				X N	W	X	X	X	X	X		X				2/15 - 5/1 3/15 - 5/15	X	X	X	X		Pollinator habitat, bloom July to October		
Slender mountain mint, <i>Pycnanthemum tenuifolium</i>	common	2.0 - 3.0				X N	W	X	X	X	X	X		X				2/15 - 5/1 3/15 - 5/15		X	X	X	X	Pollinator habitat, bloom June to September , seed very expensive, not more than 1 to 2 % of mix.		
Swamp sunflower, <i>Helianthus angustifolious</i>	common	1.0 - 2.0				X N	W	X	X	X	X	X		X				2/15 - 5/1 3/15 - 5/15	X	X	X	X		Pollinator habitat, bloom May to October		
Thickspike gayfeather, <i>Liatris pycnostachya</i>	common	1.0 - 2.0				X N	W	X	X	X	X	X		X				2/15 - 5/1 3/15 - 5/15	X	X	X	X	X	Pollinator habitat, bloom August to December		
Yellow wild indigo, <i>Baptista sphaerocarpa</i>	common	4.0 - 5.0				X N	W	X	X	X	X	X		X				2/15 - 5/1 3/15 - 5/15	X	X	X	X		Pollinator habitat, bloom April to June , seed very expensive, not more than 1 to 2 % of mix.		
Annual Grasses: Crabgrass	Red River	1.0 - 4.0				X I	W	X	X	X	X	X	X					2/15 - 5/1 3/15 - 6/15	X	X	X	X	X	Adapted to a wide variety of soils, most productive in areas of high summer rainfall. Forage quality is usually higher than most warm season perennial grasses. Reseeds well		
Forage Sorghum, grass types		10.0 - 15.0				X I	W	X	X	X	X	X	X	X				3/1 - 8/1		X	X	X	X	Adapted to a wide variety of soils, needs pH of 5.5 or greater. Highly productive and responsive to nitrogen. Nitrate or prussic acid poisoning can occur under some circumstances.		
Forage Sorghum, other		20.0 - 30.0				X I	W	X	X	X	X	X	X	X				3/1 - 8/1		X	X	X	X	Adapted to a wide variety of soils, needs pH of 5.5 or greater. Highly productive and responsive to nitrogen. Nitrate or prussic acid poisoning can occur under some circumstances.		

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Annual Grasses: Sorghum	Grain	20.0				X I	W	X	X	X	X	X	X	X	X	X	3/1 - 6/15		X	X	X	X	Adapted to a wide variety of soils, needs pH of 5.5 or greater. Highly productive and responsive to nitrogen. Nitrate or prussic acid poisoning can occur under some circumstances.
Millet, browntop		20.0				X I	W	X	X	X	X	X	X	X	X	X	4/1 - 8/1		X	X	X	X	Adapted to a wide variety of soils, best on well drained loamy, does not do well on calcareous soils. Grows 0.6 - 1.2 meters tall. Acceptable forage for horses.
Millet, foxtail		20.0				X I	W	X	X	X	X	X	X	X	X	X	4/1 - 8/1	X	X	X	X	X	Adapted to a wide range of soils, best on well drained loamy. Not recommended for horses, can cause kidney and joint problems in horses. Grows 0.3 - 1.75 meters tall.
Millet: Japanese		20.0				X I	W	X	X	X	X	X	X	X	X	X	4/1 - 8/1			X	X	X	Used primarily for wildlife, adapted to wet soils.
Millet, pearl		12.0 - 20.0				X I	W	X	X	X	X	X	X	X	X	X	4/1 - 8/1		X	X	X	X	Good for hay or silage, not as drought tolerant as forage sorghum. Adapted to a wide variety of soils, best on well drained loamy, does not do well on calcareous soils. Grows 2.0 - 3.0 meters tall.
Millet, proso		15.0				X I	W	X	X	X	X	X	X	X	X	X	4/1 - 8/1		X	X	X	X	Used primarily for wildlife food plots. Adapted to a wide range of soils, best on well drained loamy. Matures in about 60 days after emergence.
Oat		64.0 - 120.0				X I	C	X	X	X	X	X	X	X	X	X	Prepared seedbed 9/1 -10/15, Overseeded 9/15 - 11/30		X	X	X	X	Early fall grazing, ability to germinate in low moisture. Least cold tolerant, limited winter forage, poor drought tolerance once established. Usually planted in mixture. Adapted to deep loam and sandy loams. Performs better on wet soils than other cereal grains. Optimum pH range 5.0 - 7.5. Does not perform well in very wet or very dry seasons. Usually not planted in NE Texas due to lack of cold tolerance.
Rye		56.0 - 120.0				X I	C	X	X	X	X	X	X	X	X	X	Prepared seedbed 9/1 -10/15, Overseeded 9/15 - 11/30		X	X	X	X	Most drought resistant and cold tolerant of the cool season annuals. Prefers well drained sandy to loamy soils. Optimum pH range 5.0 - 7.5. Early maturity produces the most winter forage.

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Annual Grasses: Ryegrass		12.0 - 30.0				X I	C	X	X	X	X	X	X	X	X					Prepared seedbed 9/1 -10/15, Overseeded 9/15 - 11/30	Best adapted to areas of Texas that receive more than 25 inches of rainfall annually. It is adapted to a wide range of soils, and it is the best cool season annual grass on poorly drained soils. With adequate rainfall it is usually the most productive of the cool season annual grasses, but most of the production will be in the spring. Optimum pH range 5.5 - 8.0.		
Triticale		50.0 - 120.0				X I	C	X	X	X	X	X	X	X	X					Prepared seedbed 9/1 -10/15, Overseeded 9/15 - 11/30	Cross between wheat and rye. Usually yields less than rye, oats, and ryegrass. Optimum pH range 5.0 - 7.5.		
Wheat		60.0 - 120.0				X I	C	X	X	X	X	X	X	X	X					Prepared seedbed 9/1 -10/15, Overseeded 9/15 - 11/30	Good cold and drought tolerance. Good fall and winter production. Least productive of the cool season forages. Adapted to a wide range of soils. Optimum pH range 5.5 - 8.0.		
Annual Legumes: Alyceclover	common	3.0 - 10.0				X I	W				X	X	X	X					3/1 - 4/30 3/15 - 5/15	X	X	X	Best adapted to Gulf Coast and other areas of high summer rainfall. Well drained sandy soils. Tolerant of low pH. Not competitive with weeds at seedling stage.
Bur medic (cleaned seed)	Armadillo	5.0 - 8.0				X I	C	X	X	X	X	X	X	X					9/15 - 11/30		X	X	Adapted to well drained soils with pH 6.0 or higher. Cold tolerant south of I-20.
Clover, arrowleaf	Apache, Meechee, Yuchi, Amclo	8.0 - 10.0				X I	C	X	X	X	X	X	X	X					9/15 - 11/30	X	X	X	Adapted to sandy to loamy soils with pH 5.5 - 7.0 and good drainage. Late maturity, low bloat potential, good cold tolerance. Apache developed in TX.
Clover, ball	Common, Local harvest	2.0 - 4.0				X I	C	X	X	X	X	X	X	X					9/15 - 11/30	X	X	X	Adapted to loamy to clayey soils with pH 5.5 - 8.0 and fair drainage. Late maturity, low bloat potential, good cold tolerance.
Clover, berseem	Bigbee	12.0 - 15.0				X I	C	X	X	X	X	X	X	X					9/15 - 11/30	X	X	X	Adapted to loamy to clayey soils with pH 6.5 - 8.0 and fair/poor drainage. Late maturity, low bloat potential, poor cold tolerance.
Clover, crimson	Dixie, Tibbee, Flame, Chief	15.0 - 20.0				X I	C	X	X	X	X	X	X	X					9/15 - 11/30	X	X	X	Adapted to most soils with pH 6.0 - 7.0 good drainage. Early maturity, medium bloat potential, good cold tolerance.

Appendix 1 - Planting rates for seeding and sprigging in Texas, Zone 4

Name	Variety / Cultivar	Broadcast seeding rates are pounds pure live seed (PLS) per acre 3/, 5/, 6/	Southern Counties ONLY	Northern Counties ONLY	Entire Zone 4	Native (N) or Introduced (I)	Season of growth	Adaptation by Major Land Resource Areas											Seeding Guidance Soil 9/					Comments 10/
								86A	86B	87A	87B	133B	150B 11/	152B	Seeding Dates 7/, 8/	Coarse	Moderately Coarse	Medium	Moderately Fine	Fine				
Annual Legumes: Partridge pea	Comanche	13.4				X	N	W	X	X	X	X	X	X	X	X	3/1 - 6/1	X	X	X				Adapted to sands and sandy loams receiving > 19 inches of annual rainfall.
Soybean	Tyrone	50.0 - 60.0				X	I	W	X	X	X	X	X	X	X	X	3/1 - 6/1		X	X	X	X		Adapted to well drained soils, pH range is 5.5 - 8.0. Drought tolerant when used for forage. Hay is difficult to cure, and if grazed no regrowth occurs. Best used for silage.
Caley pea, Singletary pea	common	35.0				X	I	C	X	X	X	X	X	X	X	X	9/15 - 11/30			X	X	X		Adapted to loamy to clayey soils with pH 5.5 - 8.0 and fair/poor drainage. Medium maturity, fair cold tolerance. Grazing should be discontinued in late spring to avoid seed toxicity and allow reseeding.
Sweetclover	Hubam (white)	12.0				X	I	C	X	X	X	X	X	X	X	X	9/15 - 11/30 3/15 - 4/1			X	X	X		Both white and yellow sweet clovers are biennial. Adapted to well drained clay to clay loam, optimum pH range 6.5 - 7.5. The use of low coumarin varieties is recommended to reduce problems associated with this plant.
Vetch, hairy	common	15.0 - 20.0				X	I	C	X	X	X	X	X	X	X	X	9/1 - 10/15	X	X	X	X	X		Adapted to well drained soils with pH 5.0 - 8.0. Late maturity, low bloat potential, good cold tolerance. Cattle develop muscular problem when grazing vetch, especially when seed are forming. Rotating to a pasture that does not contain vetch will minimize this problem.
Winterpea, Austrian	Granger, Fenn, Melrose	35.0				X	I	C	X	X	X	X	X	X	X	X	9/1 - 10/15		X	X				Adapted to loam to sandy loam soils with pH 6.0 - 8.0 and good drainage. Medium maturity, fair/good cold tolerance. Best used w/small grain for silage, does not tolerate grazing very well.
Annual Forbs: Rio Grande clammyweed	Zapata Germplasm	8	X				I	C									3/1 - 5/1; 9/1 - 11/1	X	X	X	X	X		Use as part of a forb/legume mix
Hookers Plantain	STN-561 Germplasm	5	X				I	C									9/1 - 12/15	X	X	X	X	X		Planted onl in a mix with redseed plantain, mix is availabl commercially as Divot Tallow Weed Blend
Redseed Plantain	STN-496 Germplasm	5	X				I	C									9/1 - 12/16	X	X	X	X	X		Planted onl in a mix with redseed plantain, mix is availabl commercially as Divot Tallow Weed Blend

Appendix 1 - Planting rates for seeding and sprigging in Texas, Zone 4A - FOOTNOTES:

- 1/ Species are listed by common name and where applicable by released cultivar or variety. Planting rates are shown as by PLS.
- 2/ Conversion factors: 3.5 bushels of tops = 1 bale; 7 bushels of sprigs = 1 bale; 1.25 cubic feet = 1 bushel; 1 bushel sprigs = about 15 pounds .
- 3/ PLS = Pure Live Seed. To compute PLS from seed analysis information: Percent PLS = (% germination + % hard [dormant] seed) X % pure seed. Seeding rate in PLS pounds divided by % PLS will give you the bulk seeding rate needed to get the right amount of pure live seed. **Where a seeding rate range is provided the planner will recommend a rate based on purpose of the seeding, site conditions, site productivity, potential weed pressure, future management planned, etc.**
- 4/ Local harvest may be used when seeding species of unknown or common variety, or natural stands. Local harvested seed should have its geographic origin within 200 miles north, 300 miles south, 100 miles east and 200 miles west of the site where it will be planted. It is also desirable that locally harvested seed be used on soils of the same texture as soils where seed was harvested.
- 5/ The TZ (tetrazolium salt) test can be used for the germination factor in figuring PLS if the dealer furnishes the seed tag or other proof the test was run by a reputable seed lab.
- 6/ Seed rates listed above are for broadcast planting; drill planting rates may be reduced by up 20% at the planner's discretion. Seeding rates for row planting (spacing 21 - 40 inch) of any of the species in the table will be determined by using 1/3 of the broadcast rate, for spacing 20 inch or less use drilled rate.
- 7/ See county climate data below for average (70% chance) last freeze and first freeze dates for each Resource Team. Field office personnel should use these dates as a guide, and not initiate planting of warm season species earlier than 2 weeks before the spring date, unless otherwise noted in the Table. Seeding dates for warm season species will not be extended to less than 6 weeks before the fall date, unless otherwise noted in the Table. **Local Field Office personnel may approve planting up to 2 weeks before or after the dates in the Table if local site conditions are suitable for planting, germination, and establishment of the selected species.** Any further variance outside the dates below must be approved in writing from the Zone Office. **ONLY Southern counties can use the earliest spring dates and the fall planting dates listed for some warm season plants.**
- 8/ The optimum planting depth for sprigs & tops is 1.0 to 3.0 inches, small seeded (>35000 seed per pound) species is 1/8 to 1/4 inch, large seeded species 3/4 to 1.0 inches unless it is otherwise noted for the individual species.
- 9/ Soil groups are based on the following textures: **Coarse** - Coarse sand, Sand, Fine sand, Very fine sand, Loamy coarse sand, Loamy sand, Loamy fine sand and Loamy very fine sand; **Moderately Coarse** - Sandy loam, Coarse sandy loam and fine sandy loam; **Medium** - Very fine sandy loam, Loam, Silt loam and silt; **Moderately Fine** - Clay loam, Sandy clay loam and Silty clay loam; **Fine** - Sandy clay, silty clay and clay.
- 10/ Additional information on adaptation is available in species specific NRCS Job Sheets, Texas Agrilife Extension Service publications, Texas Agrilife Experiment Station publications, and from the references listed on the reference sheet.

County Climate Data

County	Last Spring Freeze Date	First Fall Freeze	Northern County	Southern County
		Date		
Delta	2/28	12/2	X	
Lamar	2/28	12/2	X	
Red River	2/28	12/2	X	
Hopkins	3/1	11/27	X	
Rains	3/1	11/27	X	
Wood	3/1	11/27	X	
Bowie	3/3	11/24	X	
Cass	3/3	11/24	X	
Marion	3/3	11/24	X	
Camp	3/8	11/24	X	
Franklin	3/8	11/24	X	
Gregg	3/8	11/24	X	
Morris	3/8	11/24	X	
Titus	3/8	11/24	X	
Upshur	3/8	11/24	X	
Henderson	2/28	11/30	X	
Van Zandt	2/28	11/30	X	
Harrison	2/27	11/30	X	
Panola	2/27	11/30	X	
Anderson	2/26	12/6	X	
Freestone	2/26	12/6	X	
Cherokee	2/23	12/2	X	
Smith	2/23	12/2	X	
Rusk	2/23	12/2	X	
Nacogdoches	2/27	11/27	X	
Sabine	2/27	11/27	X	
San Augustine	2/27	11/27	X	
Shelby	2/27	11/27	X	
Angelina	2/25	12/3	X	
Houston	2/25	12/3	X	
Polk	2/25	12/3	X	
San Jacinto	2/25	12/3	X	
Trinity	2/25	12/3	X	
Jasper	3/4	11/22	X	
Newton	3/4	11/22	X	
Tyler	3/4	11/22	X	
Brazos	2/11	12/18		X
Grimes	2/11	12/18		X
Robertson	2/11	12/18		X
Waller	2/11	12/18		X
Galveston	2/12	12/16		X
Harris	2/12	12/16		X
Montgomery	2/12	12/16		X
Hardin	2/13	12/10		X
Liberty	2/13	12/10		X
Chambers	1/31	12/28		X
Jefferson	1/31	12/28		X
Orange	1/31	12/28		X
Leon	2/16	12/10		X
Madison	2/16	12/10		X
Walker	2/16	12/10		X

Spring last freeze dates, most restrictive date within the team for 70% occurrence of 28 degrees F.
Based on NRCS county weather data

Fall first freeze dates, most restrictive date within the team for 70% occurrence of 28 degrees F.
Based on NRCS county weather data