

Welcome to the

Texas Grass Gathering

Sharing Knowledge. Celebrating Plants.

Wednesday, September 9, 2020
Noon - 2:00 pm (CST)

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Agenda

Grass parts of importance, Dr. Barron Rector

What to look at for ID

Identification by genera, Dr. Robert Lyons

Grouping grasses in the field

Bluestem Grasses in Texas, Dr. Megan Clayton

A field guide to native and introduced species

Grasses as livestock forage, Dr. Larry Redmon

The most used ecotypes and why

Bluestems beyond the field, Dr. Megan Clayton

How to separate King Ranch, Kleberg, and Angleton bluestems

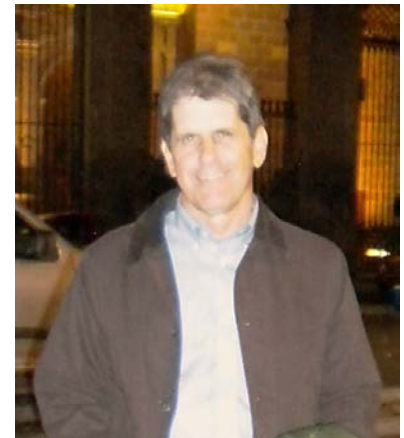
Seed Selector Tool for native plantings, Dr. Tony Falk

Texas Native Seeds

My "Big 4", Dr. Megan Clayton

Separating Klein, Switch, Johnson, and Guinea grass

Grass Identification Using Genera



Robert K. Lyons, PhD
Extension Range Specialist

Why Start with Genera?

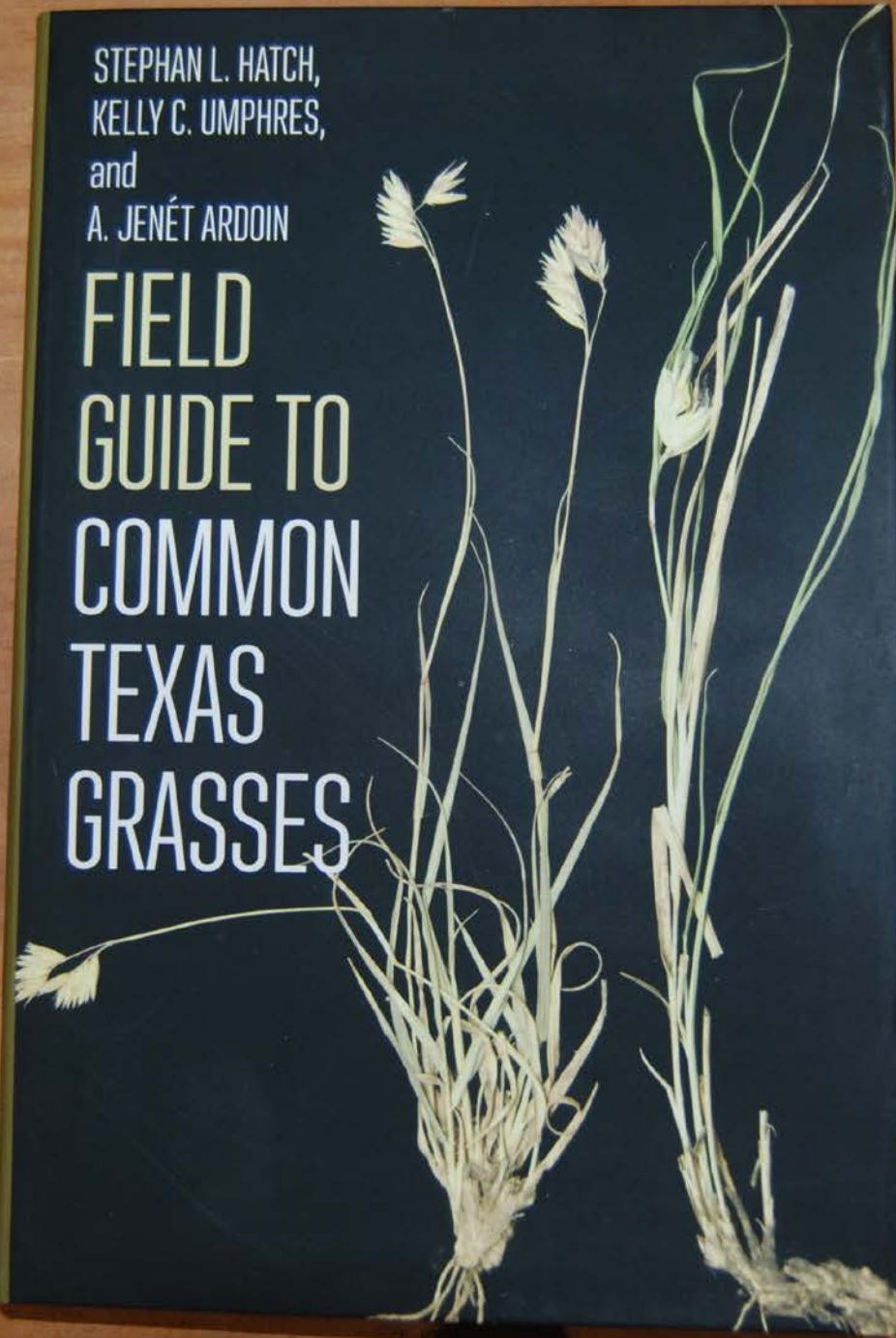
- Ultimate objective: ID to species
- 723 grass species in Texas (Shaw, 2012)
- 181 grass genera in Texas (Shaw, 2012)
- Within a county, etc. limited number of major genera & species
- Working from genera can get to species quicker
- Requires
 - Understanding certain anatomical terms
 - Practice

Texas Genera with Most Species/Genus

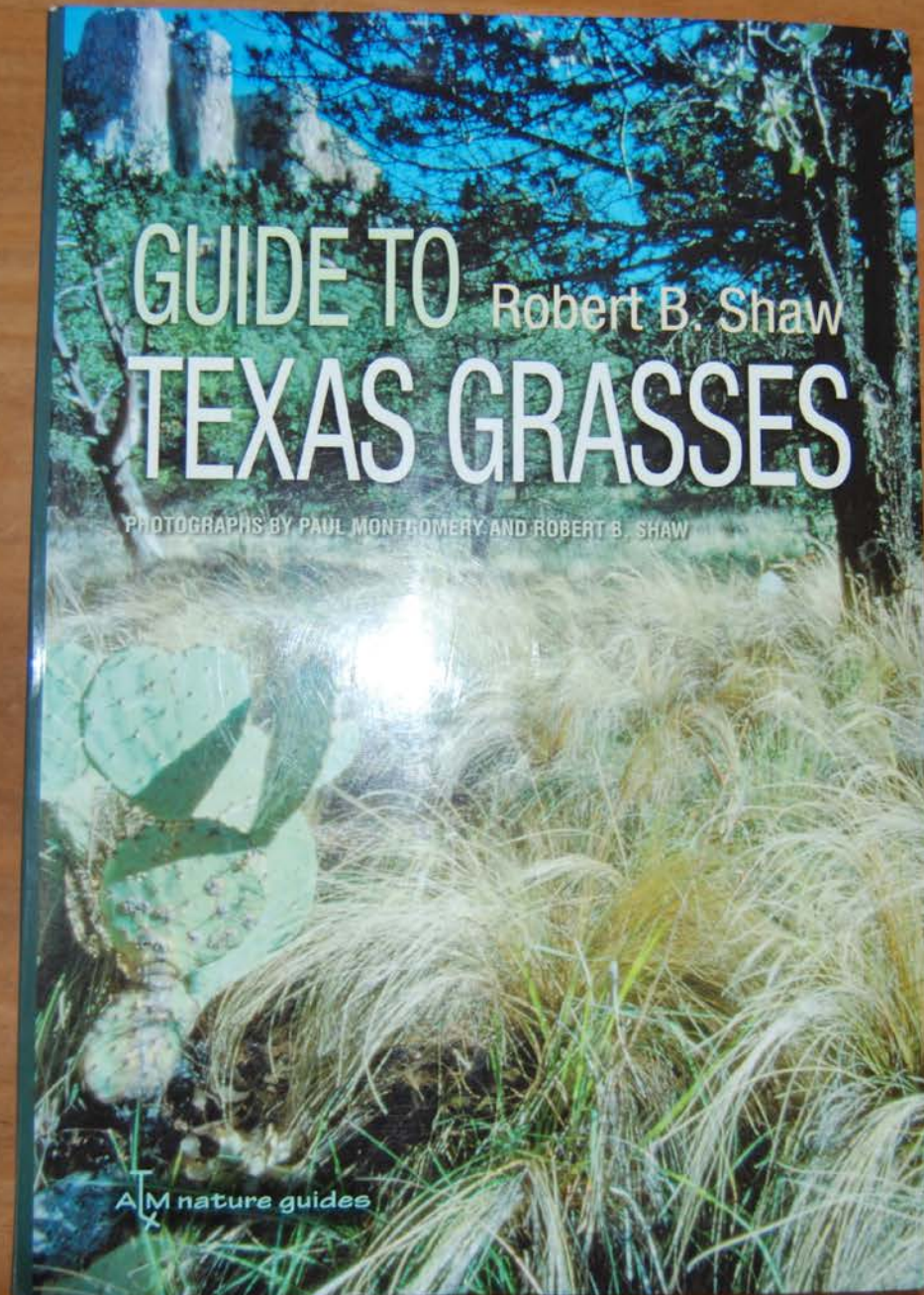
- Muhlenbergia – 50
- Eragrostis – 32
- Paspalum – 32
- Dichanthelium – 26
- Panicum – 24
- Sporobolus -23

STEPHAN L. HATCH,
KELLY C. UMPHRES,
and
A. JENÉT ARDOIN

FIELD
GUIDE TO
COMMON
TEXAS
GRASSES



Texas A&M University Press
323 pages



Texas A&M University Press
1080 pages, 668 species
keyed with illustrations,
short descriptions, some
photos



	Select Bluestem Genera		
Characteristic	Andropogon	Bothriochloa	Schizachyrium
Clums (stems)	soild, branched	solid	solid
Leaves	basal & cauline	basal & cauline	basal & cauline
Sheaths	open	open	open
Ligules	ciliate membrane	ciliate membrane	membranous
Blades	flat or folded	flat, midveines present	flat & folded
Panicle	2-6 rames (panicle branches)	numerous rames, ascending	spicate racemes terminal & axillary
Spikelet	paired: 1 sessile & fertile; 1 pedicilate & sterile	paired: 1 sessil & fertile; 1 pedicipate & sterile	paired: 1 sessil & fertile; 1 pedicipate & sterile, dorsally compressed
Glumes	subequal, flat	equal, as long as lemmas	equal
Disarticulation	base of sessile spikelets	below glumes	below glumes
Lemma awns	upper lemmas awned	upper lemmas awned	lower lemmas awnless; upper lemmas awned
Miscellaneous		most species aromatic when crushed	
Species common names	Big bluestem, Bushy bluestem, Splitbeard bluestem	Cane bluestem, Pinhole blue stem,	Little bluestem
		King Ranch bluestem, Silver bluestem	

Hatch & Umphres, 2015

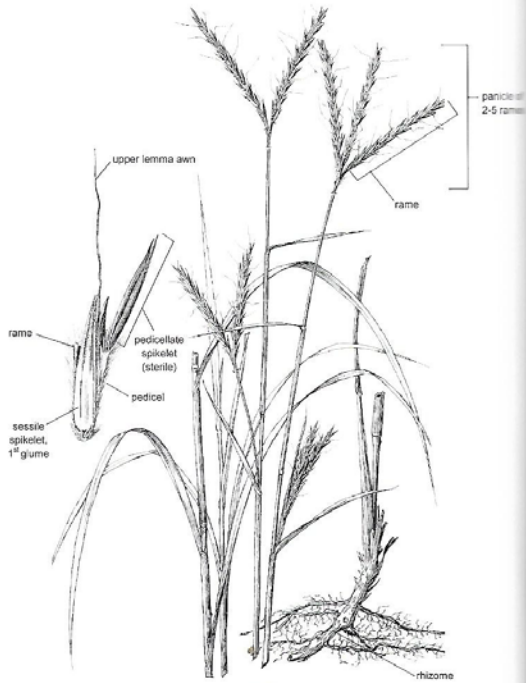
***Andropogon gerardii* Vitman**

big bluestem

NPW

Tall, tufted perennials, sometimes with rhizomes. Culms to 2 m tall, often glaucous, sparingly branched. Leaves usually villous; blades 5–10 mm wide, elongate, margins scabrous; ligules to 5 mm long, a ciliate membrane. Panicles with 2–5 rames, rames digitate or subdigitate. Sessile spikelets 8–11 mm long; glumes as long as spikelets, purplish; lemma awns 1–2 cm long, twisted and geniculate. Pedicellate spikelets as long as sessile spikelet, staminate, awnless.

A climax dominant on Blackland Prairies throughout Texas; decreases with livestock grazing. Good forage for livestock, fair for wildlife.



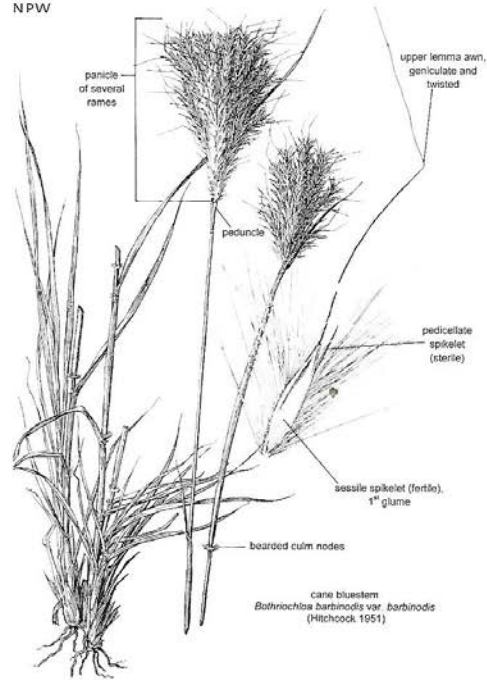
big bluestem
Andropogon gerardii
(Hitchcock 1951)



Bothriochloa barbinodis* (Lag.) Hert. var. *barbinodis

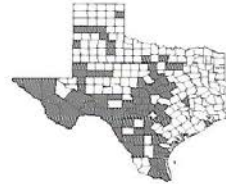
cane bluestem

NPW



Tall, coarse, tufted perennials. Culms to 120 cm tall, erect, nodes bearded. Leaves mainly cauline; ligules 1–2 mm long, membranous; blades firm. Panicles to 18 cm long, of numerous rames; rames and pedicels villous. Sessile spikelets 4.3–7.0 mm long; upper lemma awns 20–35 mm or more long, geniculate and twisted.

Adapted to loose calciferous soils. Good forage but infrequent.



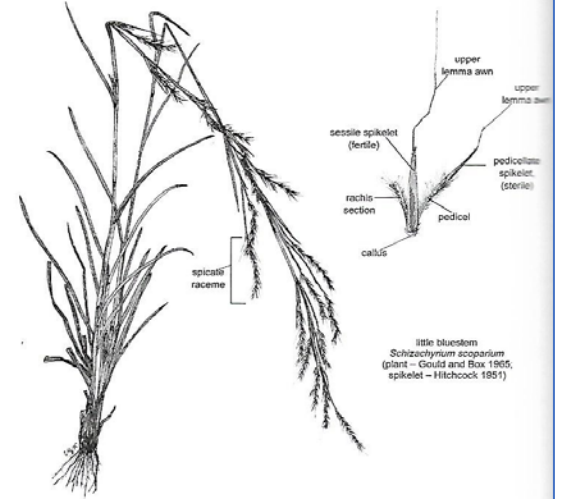
***Schizachyrium scoparium* (Michx.) Nash**

little bluestem

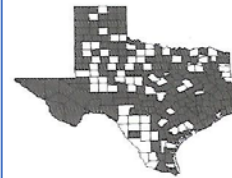
NPW

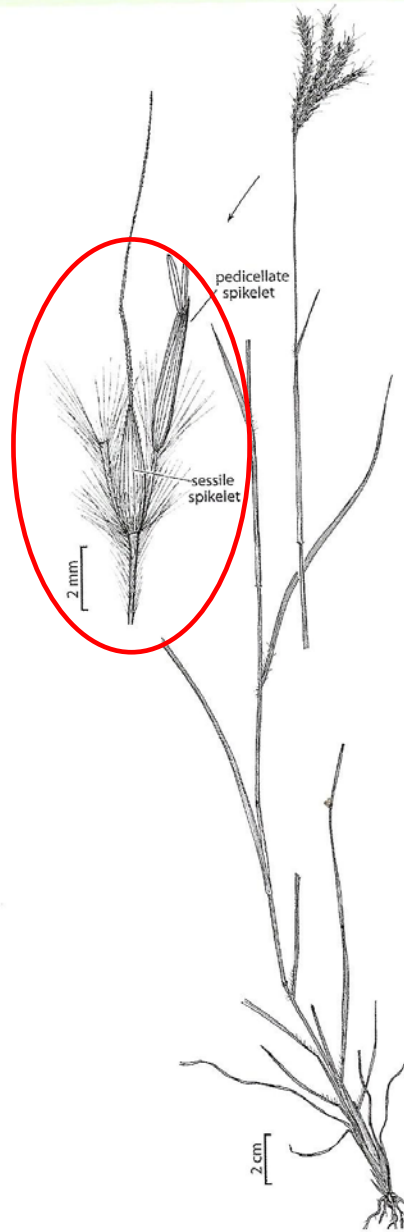
Tufted or rhizomatous perennials. Culms 50–200 cm tall, green or glaucous, branching freely above to produce numerous inflorescences per culm. Leaves with basal blades 25 cm or more long, 1.5–4.0 (rarely 6.0) mm wide, glabrous or sparsely hispid to villous. Spicate racemes mostly 2.5–5.0 cm long; rachis joints and pedicels ciliate with long, silvery hairs, at least on upper two-thirds. Sessile spikelets 6–8 mm long; first glumes glabrous or scabrous; upper lemmas 8–15 mm long, awned, awns 9–16 mm long. Pedicellate spikelets staminate or neuter, as long as sessile spikelets to much shorter, awnless or with short, straight awns. There are many intergrading forms and varieties.

A codominant of tallgrass prairies and openings in woods. Good forage for cattle; poor wildlife forage, but provides good cover.



little bluestem
Schizachyrium scoparium
(plant – Gould and Box 1965,
spikelet – Hitchcock 1951)



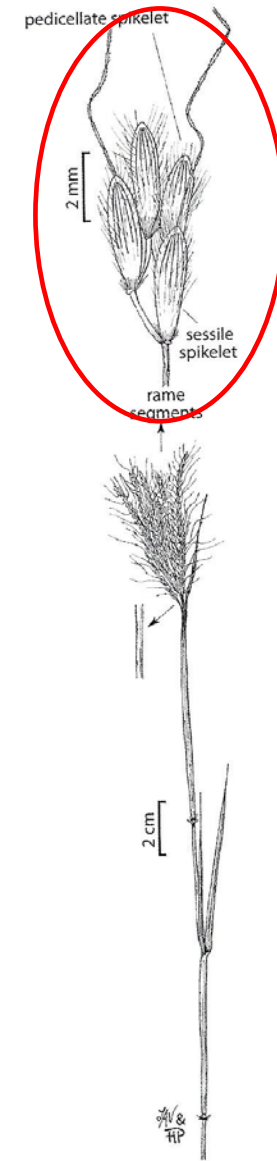


7. *Bothriochloa ischaemum* (L.) Keng (King Ranch bluestem, KR bluestem). Plants typically tufted but becoming stoloniferous and/or rhizomatous with frequent mowing or close grazing. Introduced from Europe and Asia as a forage species and for erosion control, but now escaped and established throughout most of the state. Found in seeded pastures, along roadsides, and in other moderately disturbed sites. One of the most common roadside grasses throughout much of the state. Listed as fair for wildlife and livestock (Hatch and Pluhar 1993). Powell (1994) reported it as highly palatable to livestock. Two varieties have been identified: var. *ischaemum* and var. *songarica* (Rupr. ex Fisch. & C. A. Mey.) Celarier & J. R. Harlan. They can be distinguished by the following characters:

- 1. Nodes glabrous var. *ischaemum*
- 1. Nodes pubescent var. *songarica*



Bothriochloa: King Ranch bluestem



1. *Dichanthium annulatum* (Forsk.) Stapf (ringed dichanthium, Kleberg bluestem). Stoloniferous perennial. Erect portion of culms generally >60 cm long. Nodes glabrous or short-puberulent. Lower glumes sparsely pubescent below. Introduced as a forage species but of relatively low quality for both livestock and wildlife. Found along roadsides, ditches, disturbed areas, and pastures. Poor for livestock and wildlife but good cover for birds and deer (Hatch, Schuster, and Drawe 1999).

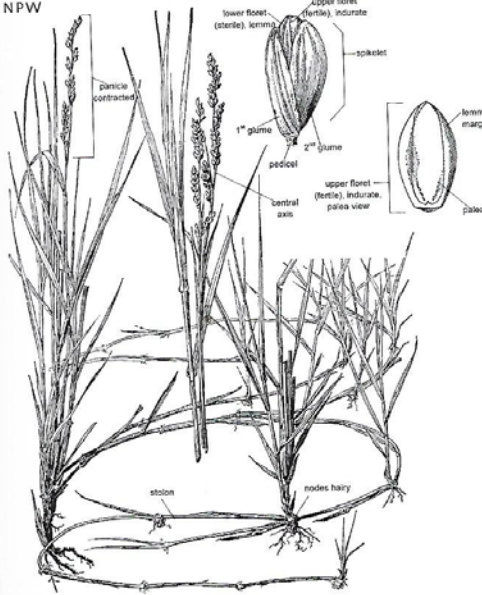
Dichanthium: Kleberg bluestem

	Panicums and Bristlegrasses	
Characteristic	Panicum	Seteria
Clums	Usually solid	Solid
Leaves	Basal or cauline	Basal or cauline or both
Sheaths	Open, cylindrical or occasionally keeled	Open, cylindrical
Ligules	Membrane or ciliate membrane or rarely absent	Ciliate membrane or line of hairs
Blades	Flat	Flat
Panicle	Open or contracted	Contracted
Spikelet	2 florets, dorasally compressed	Subtended by 1-several bristles
Glumes	Awnless, 1 st usually reduced	
Disarticulation	Below glumes	Above bristles
Lemma awns	Not awned	
Miscellaneous		
Species common names	Beaked panicum, Hall's panicum, Vine mesquite,	Plains bristlegrass, Knotroot bristlegrass, Reverchon's bristlegrass
	Switchgrass	Southwestern bristlegrass

***Panicum obtusum* Kunth**

vine mesquite

NPW

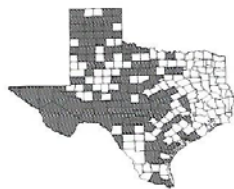


vine mesquite
Panicum obtusum
(Hitchcock 1951)

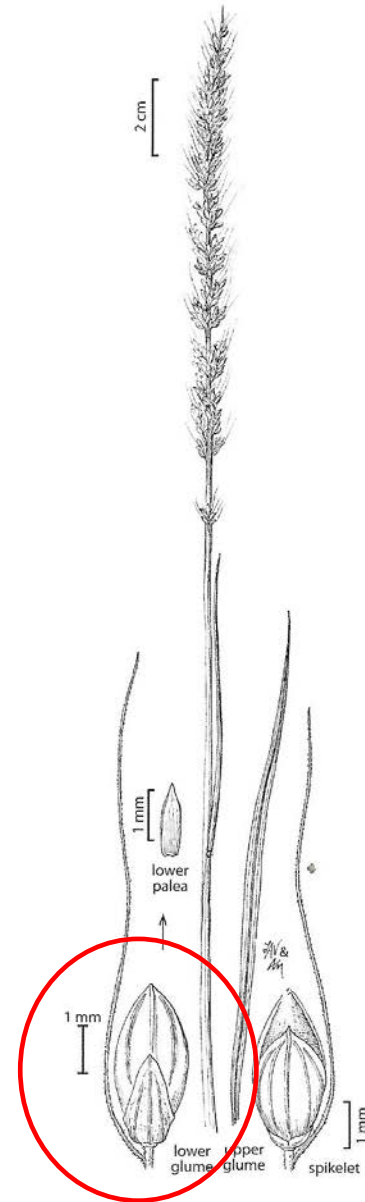


Stoloniferous perennials. Flowering culms to 50 cm tall, erect from creeping stolons (to 3 m long) with long internodes; nodes conspicuously hairy; erect, culm nodes glabrous. Leaves cauline; sheaths open, terete; ligules to 2 mm long, membranous. Panicles 3–15 cm long, contracted, with short, spicate branches. Spikelets 3.2–4.0 mm long, obovate, blunt, glabrous; first glumes about as large and long as second glumes and lower lemmas; upper floret lemmas smooth, shiny, minutely reticulate.

Frequent on fine-textured upland soils, usually growing in depressions and low places. Good forage for livestock and a fair seed producer for wildlife. One of the top four grasses in cattle diets on midsuccessional rangelands.



5. *Setaria leucopila* (Scribn. and Merr.) K. Schum. (plains bristlegrass, streambed bristlegrass). Cespitose perennial. Culms to 1 m long. Ligules 1.0–2.5 mm long. Panicles 6–15 cm long, spike-like, interrupted distally as well as basally. Lower paleas $\frac{1}{2}$ to $\frac{3}{4}$ as long as upper paleas. Found throughout the drier portions of the state, usually associated with areas that occasionally have abundant moisture. Most economically important of all the perennial species of *Setaria*. Hatch and Pluhar (1993) listed the economic value of this species as fair for wildlife and good for livestock. Powell (1994) reported it an important forage species because it is palatable and widespread.

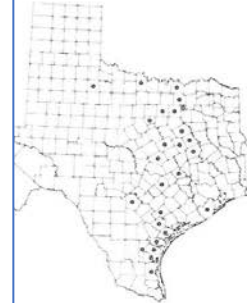
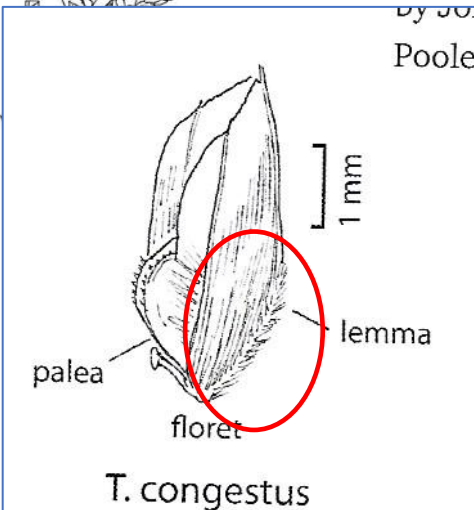
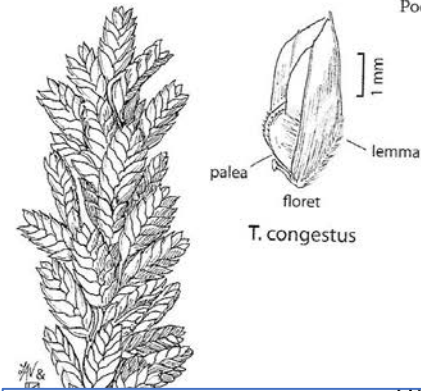


	Lovegrasses and Tridens	
Characteristic	Eragrostis	Tridens
Clums	Hollow	Solid or hollow
Leaves	Basal and cauline	Basal and cauline
Sheaths	Open, cylindrical	Open, cylindrical or keeled
Ligules	Ciliate membrane or line of hairs	
Blades	Flat or folded	Flat
Panicle	Open or contracted	Open or contracted
Spikelet	Awnless	
Glumes	Shorter than first floret	Unequal to subequal
Disarticulation	Above glumes	Above glumes
Lemma awns	No	3-nerved, short-hairy on veins below; awnless, or midvein extended as short mucro (awn)
Miscellaneous		
Species common names	Plains lovegrass, Red lovegrass, Sand lovegrass	White tridens, Purpletop, Slim tridens

13. *Eragrostis intermedia* Hitchc. (plains lovegrass). Cespitose perennial without rhizomes. Glands absent; paleas persistent. Found in clayey, sandy, or rocky soils along roadsides, waste areas, or grasslands. Closely related to the more common *E. lugens* but has differing flowering period and caryopses with a prominent adaxial groove. Reported by Hatch and Pluhar (1993) and Powell (1994) to be fair or poor for wildlife and good for livestock.



4. *Tridens congestus* (L. H. Dewey) Nash (pink tridens). Tufted perennial with short rhizomes. Culms to 75 cm long. Panicles dense. Branches erect or ascending. Spikelets more or less evenly pinkish. Found in moist depressions of otherwise dry, rocky hills. Listed as a Texas endemic (Diggs et al. 2006), but it should be expected in the grasslands and woodlands of south-central Oklahoma. Not listed as rare by Jones, Wipff, and Montgomery (1997) or Poole et al. (2007).

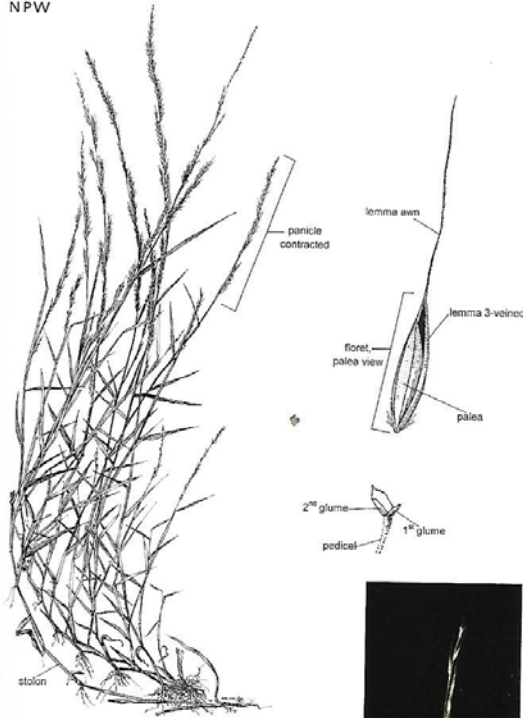


	Muhlys and Dropseeds	
Characteristic	Mulenbergia	Sporobolus
Clums	Solid	Soild or pithy
Leaves	Basal and cauline	Basal and/or cauline
Sheaths	Open, mostly terete	Open, terete, or keeled
Ligules	Membranous	Line of hairs or short cilleate membrane
Blades	Flat or involute	Flat, folded, or involute
Panicle	Open or contracted	Open or contracted
Spikelet	Laterally compressed	Pedicellate
Glumes	Usually unequal	Awnless, usually unequal
Disarticulation	Above glumes	Above glumes
Lemma awns	3-nerved, usually awned	1-veined
Miscellaneous		Panicles often enclosed or partially enclosed in subtending sheath
Species common names	Lindheimer muhly, Niblewill, Seep muhly	Tall dropseed, Sand dropseed, Smutgrass

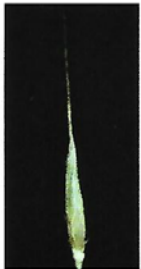
Muhlenbergia schreberi J. F. Gmel.

nimblewill

NPW



nimblewill
Muhlenbergia schreberi
(Hitchcock 1951)



Weak, usually stoloniferous perennials. Culms to 50 cm long, decumbent, much-branched and rooting at lower nodes. Flowering culms to 40 cm tall, slender. Leaves cauline; sheaths terete, shorter than internodes; ligules minute, membranous; blades 4–8 cm long, 1–4 mm wide, thin. Panicles 5–14 cm long, contracted; branches short, usually appressed. Spikelets 2.0–2.5 mm long; first glumes rudimentary or absent; second glumes 0.1–0.3 mm long; lemmas 2.0–2.5 mm long, more or less pubescent at base, 3-veined, awned; awns 1.5–5.0 mm long, greenish; paleas scabrous, about as long as lemmas.

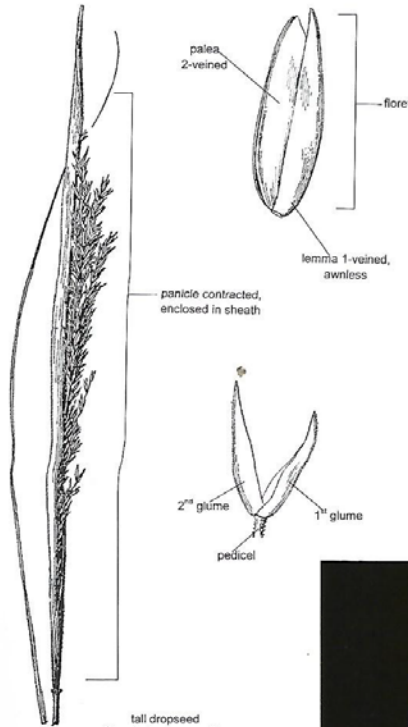
Infrequent on sandy soils of savannahs and woodlands in partial shade. Poor forage.



Sporobolus compositus (Poir.) Merr.

tall dropseed

NPW

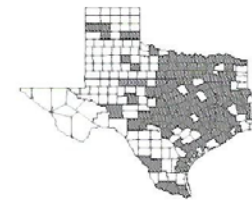


tall dropseed
Sporobolus compositus
(Hitchcock 1951)

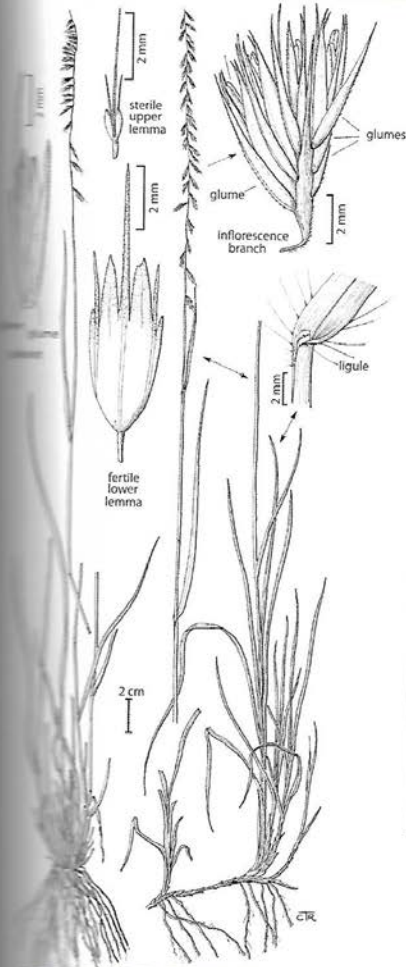


Tufted perennials. Culms to 120 cm tall, 2–5 mm wide at base, erect; cleistogamous spikelets in axillary panicles, partially or entirely enclosed within sheaths. Leaves basal and cauline; sheaths open, terete, ligules minute, a ciliate membrane; blades to 50 cm long, flat or folded, uppermost ascending. Panicles 5–30 cm long, contracted, often entirely enclosed in the inflated, subtending sheaths. Spikelets 4–9 mm long; glumes keeled with bright green midvein; second glumes about twice as long as first glumes; lemmas 1-veined, apices rounded, longer than glumes; paleas well developed.

Prairies or disturbed sites, such as near roads. Poor forage.

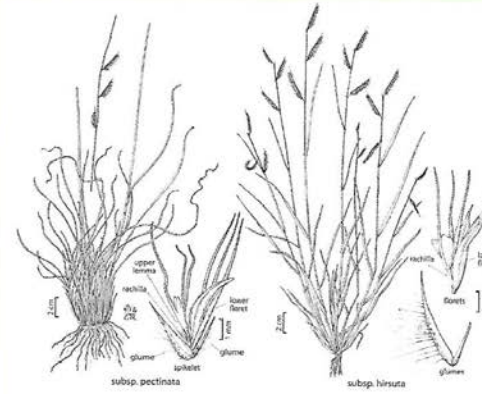
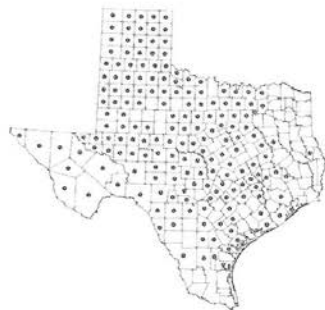


	Gramas
Characteristic	Bouteloua/Chondrosum
Clums	Solid
Leaves	Basal and cauline
Sheaths	Open, terete or keeled
Ligules	Membranous or line of hairs
Blades	Flat or folded
Panicle	Spicate unilateral primary branches
Spikelet	Sessile or subsessile
Glumes	1-veined
Disarticulation	
Lemma awns	3-veined, awned
Miscellaneous	
Species common names	Sideoats grama, Hairy grama, Texas grama, Blue grama



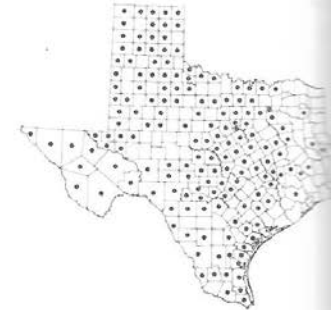
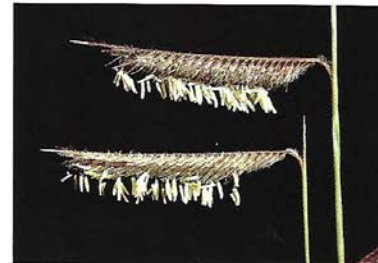
3. *Bouteloua curtipendula* (Michx.) Torr. (sideoats grama). A caespitose perennial with or without rhizomes. Base of leaf margins usually with white, papillose-based hairs. Widely distributed species abundant in most grasslands in the state. This is the Texas state grass. Listed as good for wildlife and livestock (Hatch and Pluhar 1993). Powell (1994) described this species as one of the best forage species in the Trans-Pecos. Telfair (2006) listed the seeds as especially important for wildlife. Two varieties occur within the state: var. *curtipendula*; and var. *caespitosa* Gould & Kapadia. They can be distinguished by the following character:

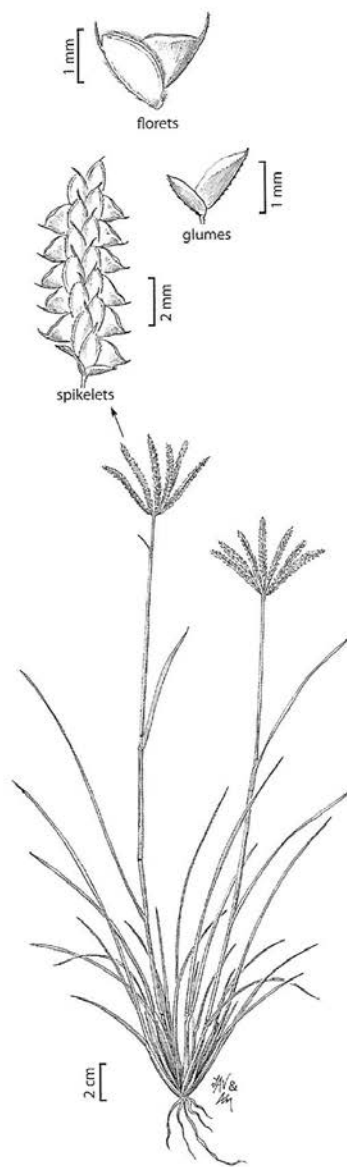
- 1. Plants with long rhizomes..... var. *curtipendula*
- 1. Plants without long rhizomes, sometimes from a knotty base var. *caespitosa*



5. *Chondrosium hirsutum* (Lag.) Kunth (hairy grama, tall grama). A perennial, occasionally with stolons. Panicles 1–6 branches, sometimes digitate. Branches persistent, straight, axes extend up to 1 cm beyond the terminal spikelet, with papillose-based hairs. Disarticulation above the glume. A widespread species of numerous habitats, often in rocky areas or clay soils. Listed as fair for wildlife and livestock (Hatch and Pluhar 1993; Powell 1994). Two subspecies are recognized: subsp. *hirsutum*; and subsp. *pectinatum* (Featherly) R. B. Shaw. Gould (1975b) and Hatch, Gandhi, and Brown (1990) consider the latter as a separate species (*Bouteloua pectinata* Featherly). The subspecies can be distinguished by the following characters:

- 1. Rachilla internodes subtending second florets without an apical tuft of hairs; culms usually decumbent and branched subsp. *hirsutum*
- 1. Rachilla internodes subtending second florets with an apical tuft of hairs; culms usually erect and unbranched subsp. *pectinatum*



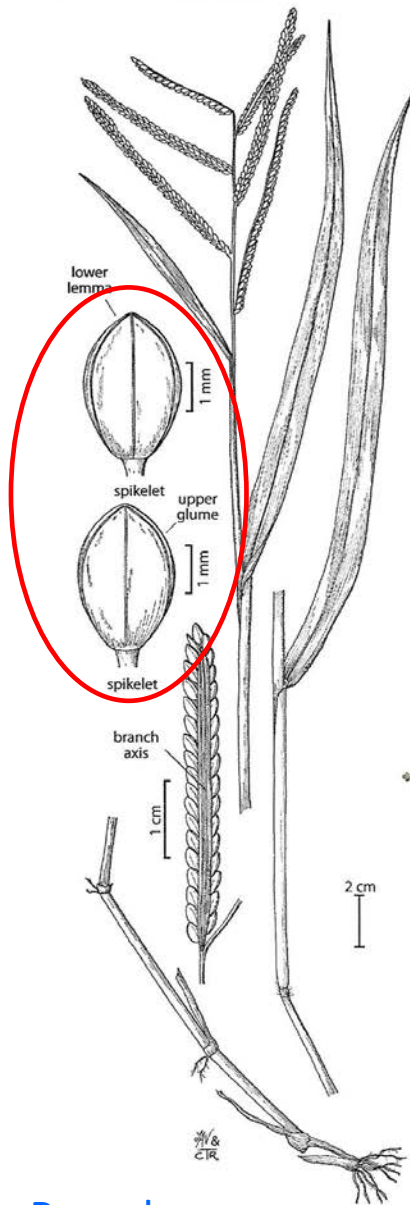


Chloris

5. *Chloris cucullata* Bisch. (hooded windmillgrass, hooded fingergrass, crowfoot). A perennial with erect culms up to 60 cm or longer. Ligules 0.7–1.0 mm long. Panicle branches 1–20, in several closely spaced whorls. Disarticulation below the glumes. A common weed of roadsides and waste places throughout most of Texas. Also found in prairies, where it is considered a fair forage species (Hatch and Pluhar 1993). Most commonly found on sandy soils.

	Windmillgrass
Characteristic	Chloris
Clums	Solid, branched or unbranched
Leaves	Basal and cauline
Sheaths	Open, terete or keeled
Ligules	Ciliate membrane
Blades	Flat or folded or involute
Panicle	Spicate primary unilateral branches, branches verticillate, digitate, or aggregated on upper portion of the central axis
Spikelet	Sessile or subsessile
Glumes	1-veined
Disarticulation	Above glumes
Lemma awns	3-veined, awned
Miscellaneous	
Species common names	Hooded windmillgrass, Shortspike windmillgrass
	Showy chloris

24. *Paspalum pubiflorum* Rupr. ex E. Fourn. (hairyseed paspalum, hairyseed crowngrass). Perennial, decumbent, roots at lower nodes. Culms to 1.3 m long. Ligules 1–3 mm long, membranous. Panicles terminal with 2–7 racemously arranged branches. Found in shady, low moist areas, ditches, and swales. Fair forage and fair seed producer (Hatch, Schuster, and Drawe 1999). Gould (1975b) listed 2 varieties based primarily on pubescence patterns. The variation seems almost continuous and does not warrant varietal recognition.



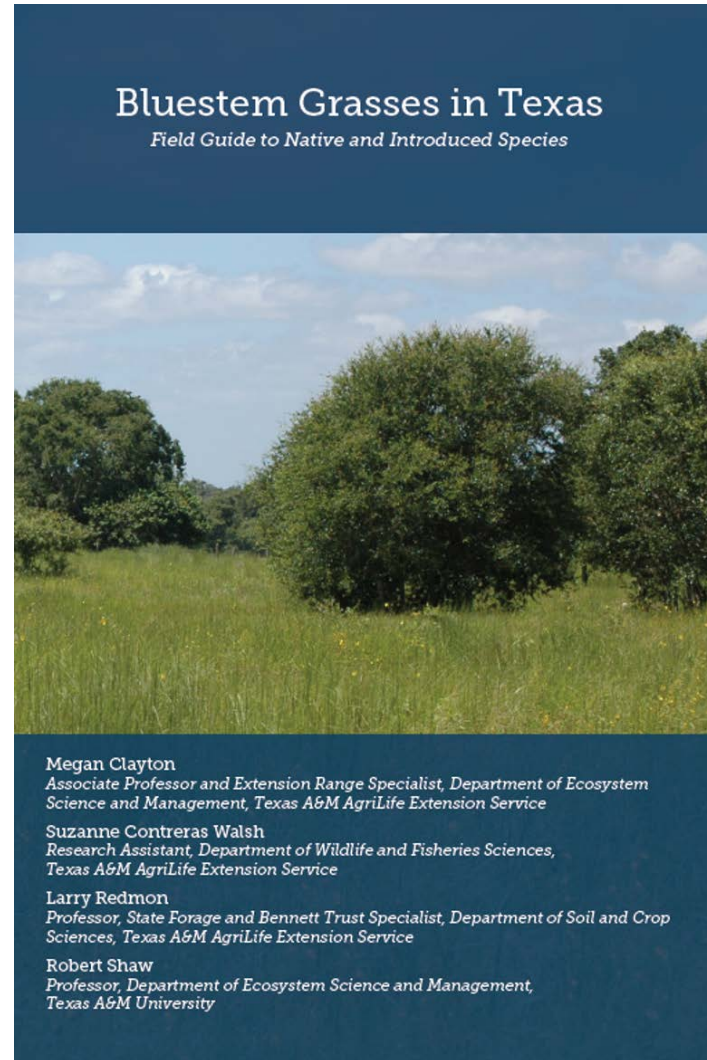
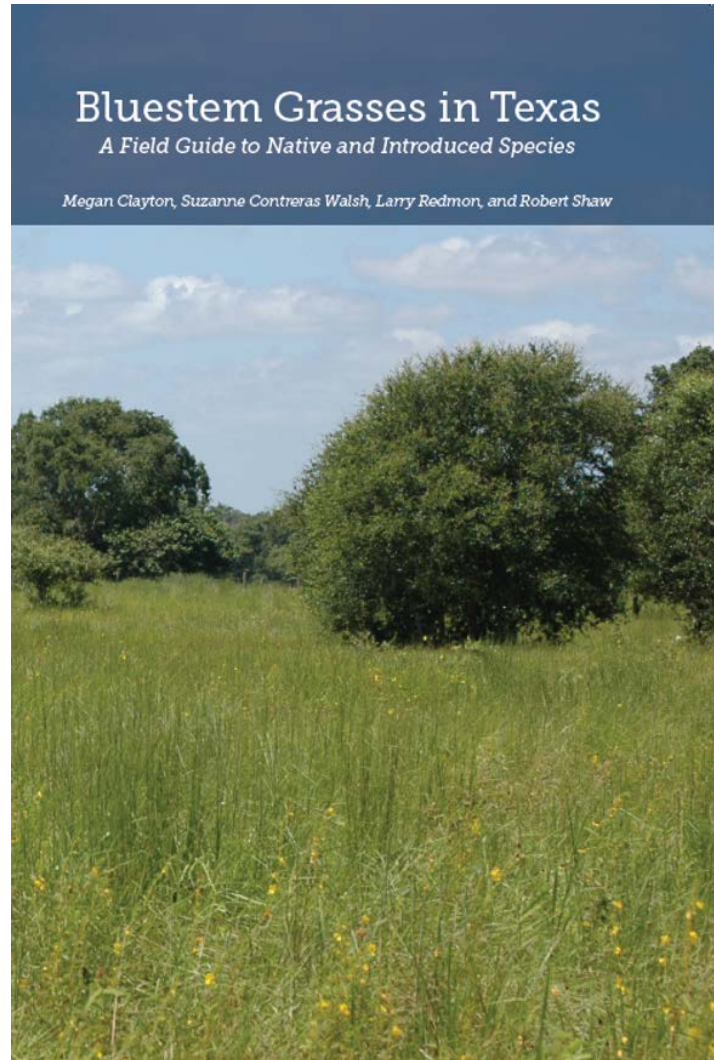
Paspalum

Characteristic	Paspalum
Clums	Solid
Leaves	Basal and cauline
Sheaths	Open, terete or keeled
Ligules	Membranous or line of hairs
Blades	Flat or folded
Panicle	Spicate primary unilateral branches, alternate
Spikelet	Solitary or paired, awnless
Glumes	1 st usually absent
Disarticulation	Below glumes
Lemma awns	No
Miscellaneous	
Species common names	Brownseed paspalum, Dallisgrass, Longtom, Bahiagrass Thin paspalum



Pete Flores

A Reason to PARTY in 2020!



Bluestem Grasses in Texas

TEXAS A&M
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REVERSING THE
QUAIL DECLINE
IN TEXAS 

Authors: **Megan Clayton,
Suzanne Walsh, Larry
Redmon, and Bob Shaw**

Editor: **Diane Bowen**

Designer: **Kelsey Siegmund**

BLUESTEMS

- **27 Species**

- 21 Native
- 6 Introduced

- **4 Genera**

- Andropogon
- Bothriochloa
- Dichanthium
- Schizachyrium

The icons below identify the bluestem grass species as native (N) or introduced (I).

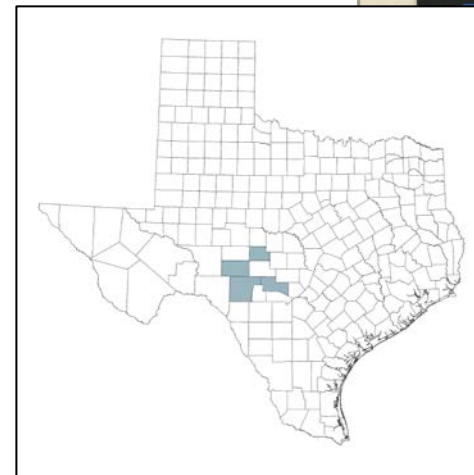


Each photograph is labeled with a corresponding number listed in the Figure Credits on page 75, with more detailed information.

27 Bluestems?

- Angleton
- Australian
- Awnless
- Big
- Broomsedge
- Bushy
- Cane
- Crimson
- Elliott's
- Honey
- Hybrid
- King Ranch
- Kleberg
- Little
- Longspike silver
- Merrill's
- Pitted
- Sand
- Seacost
- Silky
- Silver
- Slender
- Splitbeard
- Springfield

- Tall
- Texas
- Wright's



Individual Pages

Angleton bluestem (awned dichanthium)

Scientific name: *Dichanthium aristatum* (Poir.) C. E. Hubb.

Height: Stems typically 2–3 feet but lie on the ground and curve upward with plant height just over 1 foot.

Growth habit: High density of reproductive shoots; has horizontal aboveground stems that are generally 6 feet long or more and can form new plants (stolons).

Stems: Purplish green, coarse, branched above the base. Typically 2–3 feet off the ground but lie along the ground and curve upward.

Stem joints: Hairless or with dense, short hairs

Leaves: Originate from up the stem. 2½ to almost 10 inches long and up to ¼ inch wide. Hairless or with stiff hairs.

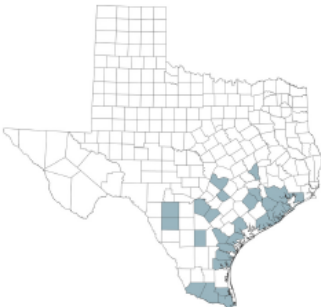
Seed heads: Green with reddish-brown awns, usually grouped into 3–5 fingerlike branches at the end of the stem. Very hairy ½–1 inch below the seed head.

Seed head branches: 2–8 branches per seed head, usually 3–5. 1½–2½ inches long. Erect to widely spreading, usually upward. Bases covered in hairs.

Awns: Reddish-brown, S-shaped (bent twice). ½–1 inch long, needlelike.

Texas distribution: Limited. Restricted to Central and South Texas and along the Gulf Coast. Salt tolerant. Cold tolerance poor. High amounts of moisture needed for good growth. Introduced from India.

Soil: Low areas of heavier soils, which contain more clay. Generally not well adapted to sand.



3

Uses and management

Livestock: Originally introduced to Texas as a forage grass. Nutritive value high during leafy stages in the spring; later becomes stemmy and less palatable. Proper grazing management is needed to maintain healthy, dense stands. Grows later in the spring and fall than most other introduced bluestems. Fertilize according to soil test results. Requires moisture for good growth. Can be established from seed.

Wildlife: Poor. Can invade native-pasture fields quickly, creating a monoculture, thus reducing plant diversity and the land's usefulness for wildlife. As a bunchgrass, can provide nesting cover for birds when maintained at lower densities and fawning cover for white-tailed deer when mature.

Landscapes and erosion control: Has been used in lawns and for erosion control. Grows readily in wet conditions. Considered a weed in disturbed areas, pastures, along roadsides, and in ditches.

Control: Difficult. Limited to hand-pulling young plants and glyphosate spot treatments.

Similar bluestems: big, Kleberg, King Ranch

Ecotypes

Gordo bluestem

Description: Seedlings lie along the ground, establish readily. Leafy stems grow up to 6 feet starting in late spring/early summer into fall. Introduced from South Africa. Released by the Soil Conservation Service in 1957.

Distribution: Typically found on the Blacklands south of San Marcos and along the Gulf Coast. Favors areas with heavier (clay) soils and more rain. Poor cold tolerance.

Uses and management: Pasture or hay grass; preferred by cattle. Use rotational grazing before plants become stemmy to maximize use and maintain plant persistence. Increase growth with fertilizer and/or irrigation.

Comparison to other bluestems: Less leafy and nutritious, stands appear to persist longer than Medio.

Medio bluestem

Description: Dark green, very leafy, fine stemmed. Stems grow along the ground to 2½ feet long. Emerges in late spring; reaches maturity in summer and late fall. Forms a dense turf.

Reproduces/spreads by self-seeding; spreads rapidly via prostrate stems. Origin unknown, but found along Medio Creek in Bee County, Texas. Released by Soil Conservation Service in 1954.

Distribution: Suited to the richer, heavier soils of the Blacklands; also produces well in the clay soils of South Texas. Only plant in sandy soils if shallow with a clay layer within 1½ feet. Cold tolerance extends no farther north than a line from San Marcos to La Grange.

4

Uses and management: Pasture or hay grass, use rotational grazing before plants become stemmy to maximize use and maintain plant persistence. Soil erosion control. Increase growth with fertilizer and/or irrigation.

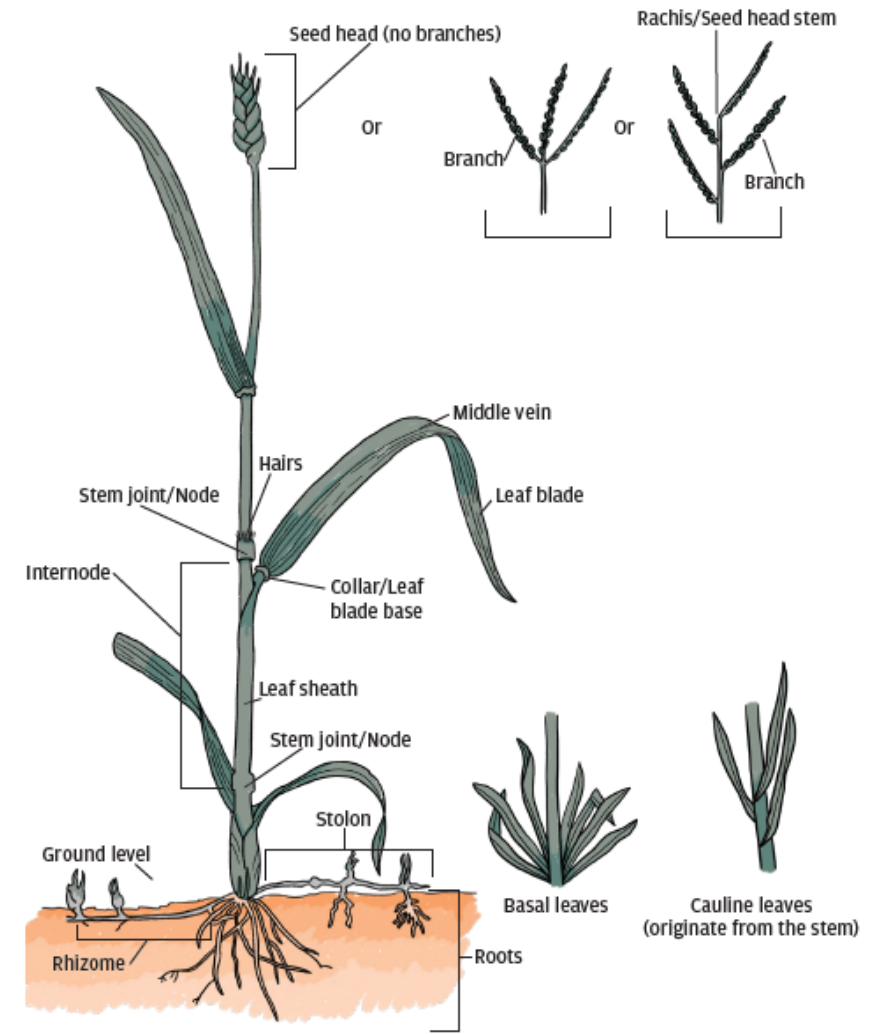
Comparison to other bluestems: Leafier and more nutritious than Gordo; Medio stands appear to not persist as long as Gordo.



5

The Only Parts You Need to Know

Parts of a Grass Plant



How to Use this Guide

Three simple steps for using this guide:

- To avoid aimlessly flipping through all the plants, first refer to the seed head key (pages 66–68) to narrow down the list. Determine which group of bluestems your grass's seed head fits best.
 - Next, check either the range maps on individual plant pages or the list of bluestems by county (pages 69–73) to learn which bluestems are likely to be in your area. You now should have just a few plants to consider.
 - Find the individual page for each plant and compare the characteristics listed to those of your unknown plant—all the individual pages for the 27 grasses are in alphabetical order by common plant name. Or check the index for a specific page number.

We have tried to use as many nontechnical terms as possible. However, a drawing of plant parts (page vii) and the glossary (page 74) may help you clarify what to look for.

- For help in measuring, a small ruler is printed on the back cover. The book itself is 9 inches tall.

Note: When sources disagree on a description, this book uses those of the Utah State University Intermountain Herbarium (www.herbarium.usu.edu/webmanual).



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Seed Head Comparisons

A. Comparisons of Similar Seed Heads

A good way to identify a particular bluestem species is to check its seed heads and compare them with photos of species with seed heads that look alike.

In this section, the seed heads of similar-appearing bluestems are grouped into tinted boxes. Within the boxes, they are further sorted into common, limited, and rare species.

Silky bluestem stands alone because it is easy to identify by its extremely long awns and fuzzy, dense, white hairs.

The icons below identify each bluestem grass species as common, limited, or rare species.



Common Species



Limited Species



Rare Species



108

● ● **Bushy**
(page 16)



109

● ● **Little**
(page 35)



110

○ ● ● **Broomsedge**
(page 14)



111

○ ● ● **Seacoast**
(page 46)



112

○ ● ● **Splitbeard**
(page 54)



113

○ ○ ● **Crimson**
(page 20)



114

○ ● ○ **Elliott's**
(page 22)



115

○ ○ ● **Honey**
(page 24)



116

● **Big**
 ● (page 11)



117

● **King Ranch**
 ● (page 28)



118

○ **Angleton**
 ● (page 3)



119

○ **Kleberg**
 ● (page 32)



120

● **Sand**
 ● (page 44)



121

○ **Australian**
 ● (page 6)



122

○ **Pitted**
 ● (page 42)



123

● **Wright's**
 ○ (page 62)



124

○ ● ●
Silky
(page 48)



125

○ ● ●
Slender
(page 52)



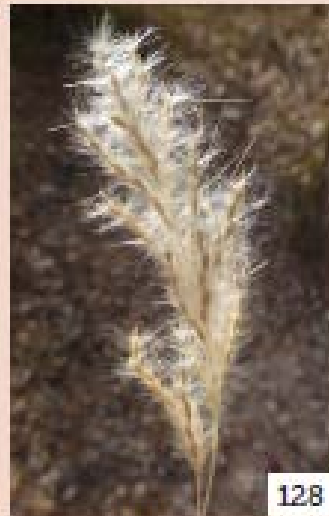
126

○ ● ○ ●
Texas
(page 60)



127

●● Cane
(page 18)



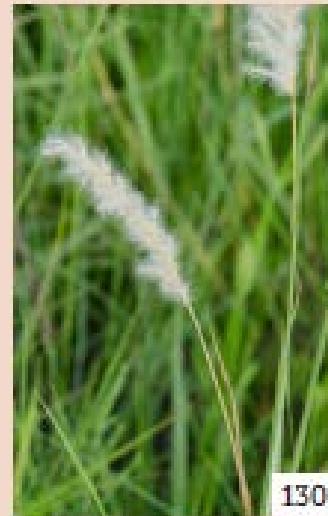
128

●● Silver
(page 50)



129

○● Hybrid
(page 26)



130

●● Longspike silver
(page 38)



131

○● Springfield
(page 56)



132

○● Awnless
(page 9)



133

○● Merrill's
(page 40)



134

○● Tall
(page 58)

How to Use this Guide

Three simple steps for using this guide:

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Bluestems by County

B. Bluestems by County

Below are Texas counties with documented bluestem grass species.

Key

AN: Angleton

CA: Cane

KR: King Ranch

SA: Sand

SV: Silver

AU: Australian

CR: Crimson

LS: Longspike
silver

SB: Splitbeard

TL: Tall

AW: Awnless

EL: Elliott's

SE: Seacoast

TX: Texas

BG: Big

HN: Honey

LT: Little

SF: Springfield

WR: Wright's

BR: Broomsedge

HY: Hybrid

MR: Merrill's

SK: Silky

BU: Bushy

KL: Kleberg

PT: Pitted

SL: Slender

Bluestems by County (4 pages)

Counties and grasses

Anderson: BG, BR, BU, KR, LS, LT, SB, SV

Andrews: BG, CA, SF

Angellina: BG, BR, BU, KR, LT, SB, SL, SV

Aransas: AU, AW, BG, BR, BU, CA, LT, SB, SE, SK, SV

Archer: SV

Armstrong: BG, SF, SV

Atascosa: CA, HY, LS, LT, SV

Austin: AN, BG, BR, BU, LT, SV

Balley: BG, CA, LT, SA, SF, SV

Bandera: BU, CA, LT, SV

Bastrop: BG, BR, BU, HY, LS, LT, SB, SV

Baylor: SV

Bee: AN, BG, BR, CA, HY, LS, LT, SV

Bell: BR, BU, CA, KL, KR, LT, PT, SK, SV

Bexar: AN, AU, BG, BU, CA, HY, KR, LS, LT, SV

Blanco: BG, BU, CA, KR, LT, SV

Borden: BG, LT

Bosque: BR, CA, KR, LT, SV

Bowie: BG, BR, LT

Brazoria: AN, AU, AW, BG, BR, BU, KL, KR, LS, LT, SL, SB, SV

Brazos: AN, AU, BG, BR, BU, CA, EL, KL,

KR, LS, LT, SB, SK, SV

Brewster: BG, BU, CA, CR, HN, KR, LT, SA, SF, SV, TL, TX

Briscoe: BG, LT, SA, SV

Brooks: AU, BG, BR, BU, CA, LS, LT, SE, SV

Brown: BG, BU, CA, KR, LT, SV

Burleson: KR, LS, LT, SB, SV

Burnet: BU, HY, KR, LS, SK, SV

Caldwell: AN, BU, CA, KR, SK, SV

Calhoun: BG, BU, LS, LT, SB, SE, SV

Callahan: LT, SA, SV

Cameron: AN, AU, BR, BU, CA, HY, KL, KR, LS, PT, SE, SB, SK, SV

Camp: BR, BU, LT, SB

Carson: BG, KR, LT, SA, SF, SV

Cass: LT, SB

Castro: LT, SV

Chambers: AN, AW, BG, BR, BU, KR, LS, LT, SB, SL, SV

Cherokee: BU, LT, SB, SV

Childress: BG, SV

Clay: LT

Cochran: BG, LT

Coke: None

Coleman: SV

Collin: BR, SV

Collingsworth: BG, LT, SA, SV

Colorado: AN, KR, LS, LT, SB, SV

Comal: BG, BU, KR, LT, SK, SV

Comanche: BU, SV

Concho: None

Bluestem Distribution

C. Bluestem Species Distribution in Texas

Common or widespread

Big bluestem

Bushy bluestem

Cane bluestem

King Ranch bluestem

Little bluestem

Silver bluestem

Limited

Angleton bluestem

Broomsedge bluestem

Hybrid bluestem

Kleberg bluestem

Longspike silver bluestem

Sand bluestem

Seacoast bluestem

Silky bluestem

Slender bluestem

Splitbeard bluestem

Springfield bluestem

Uncommon/rare

Australian bluestem

Awnless bluestem

Crimson bluestem

Elliott's bluestem

Honey bluestem

Merrill's bluestem

Pitted bluestem

Tall bluestem

Texas bluestem

Wright's bluestem

Simple Glossary

D. Glossary

awn. A long, stiff bristle or hair at the end of a seed.

axis. The main stem of a plant or inflorescence.

blade. The broad, flat, elongated part of a leaf.

branch. A secondary stem that grows from the plant axis.

bunchgrass. A grass that grows in distinct clumps instead of forming a sod or mat.

collar. A band on the leaf where blade and the sheath join.

ecotype. A genetically distinct organism that is adapted to a specific environment; usually, a subdivision of a species.

flower. The reproductive structure of a plant.

glume. A leaf-like structure that is below a spikelet (single seed unit) in the seed head of a grass.

hair. A fine, threadlike outgrowth from the surface of a plant.

inflorescence. A flower or seed head grouping, usually growing from the top of the stem.

leaf, basal. A leaf that grows from the bottom of the stem.

leaf, cauline. A leaf that originates along the upper part of the stem.

node. A swollen part of a stem where the leaf sheath originates; a joint.

rhizome. A stem that originates at the base of the main stem, grows horizontally underground, and produces new plants.

root. The part of a plant that is usually underground, supports the plant, and draws minerals and water from the soil.

seed head. The flowering (reproductive) part of a grass stem; the inflorescence; it includes the seeding parts.

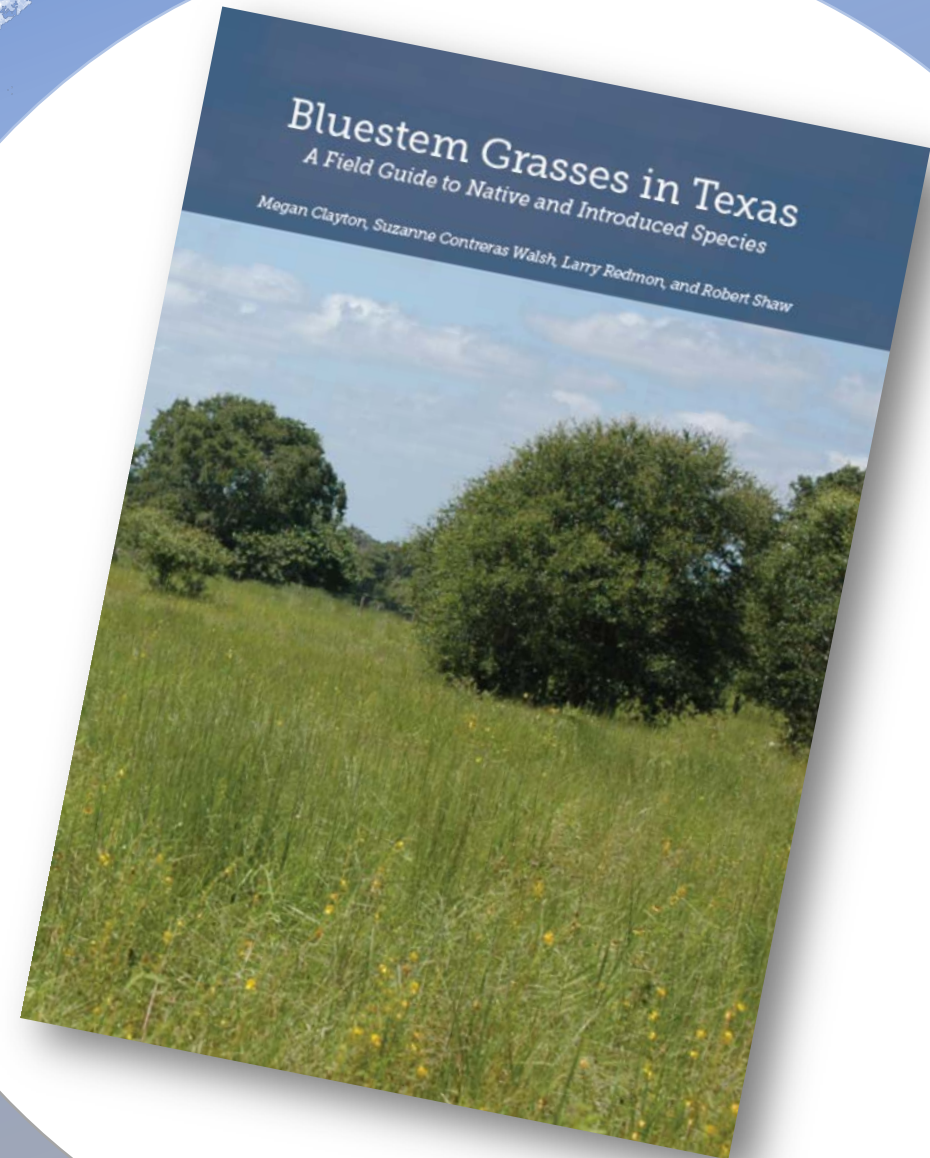
Ordering Options (\$20)

1. Marketplace

- While supplies last – cheaper shipping
- https://secure.touchnet.com:443/C21490_ustores/web/product_detail.jsp?PRODUCTID=13419&FROMQRCODE=true
- Link in the agenda emailed yesterday

2. AgriLifeBookstore.org

- Search box at top – type “Bluestem grasses in Texas”



Grass as Livestock Forage – Which Ones?

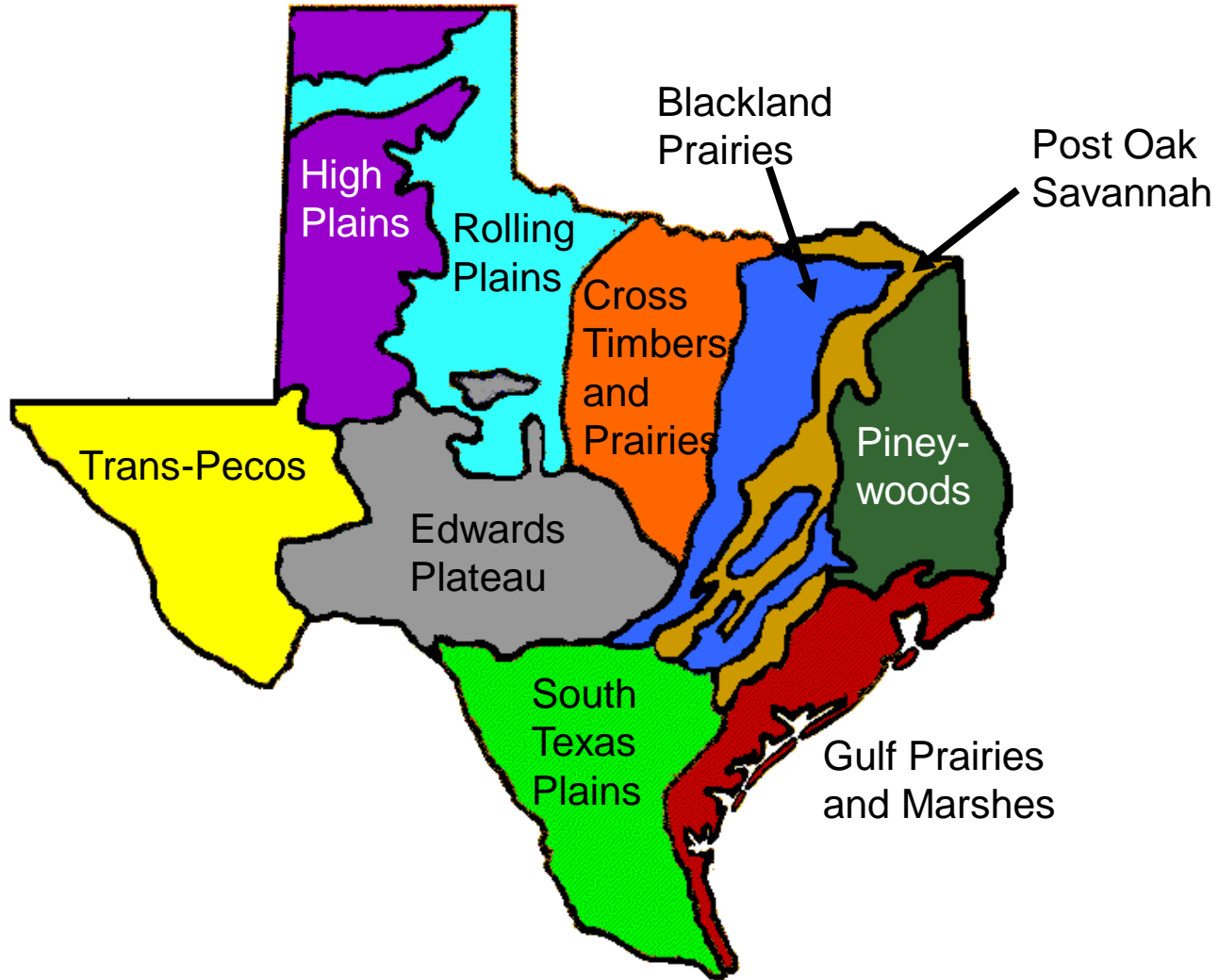


Larry A. Redmon

Texas A&M AgriLife Extension
Service



Vegetation Areas of Texas



Introduced vs Native

- Introduced (not necessarily improved)
 - Africa
 - Bermudagrass, kleingrass, Wilman and weeping lovegrass, johnsongrass, sorghum, sorghum-sudangrass, sudangrass, pearl millet, teff
 - Asia
 - Old World bluestems, johnsongrass,
 - South America
 - Bahiagrass, dallisgrass
- Native

Introduced vs Native

- Bermudagrass, bahiagrass, and dallisgrass are typically grown east of IH35/IH37.
- Kleingrass, Wilman lovegrass, and Old World bluestems are typically grown west of IH35.
- Most of the natives are found west of IH35

Forage Choices by Vegetation Region for Grazing

	Gulf Prairies & Marshes	Piney- woods	Post Oak Savannah	Blackland Prairies	Cross Timbers & Prairies	South TX Plains	Edwards Plateau	Rolling Plains	High Plains	Trans- Pecos
Bahiagrass	XX	XXX	XXX	XX						
Bermudagrass	XX	XXX	XXX	XX	X	X	X			
Buffelgrass						XXX				
Dallisgrass	XXX	XXX	X							
Kleingrass			XX	XX	XX	X	XX	X		
Natives	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
OWB	XXX		XX	XX	XX	X	XXX	XXX	XXX	X

For hay, use bermudagrass if adapted due to a better DM return for your fertilizer dollar...

Livestock Forage

- Any of the forage species can serve as the basis for livestock production enterprise.
- Stocking rate is the most important aspect.
- Under grazing there is little to no requirement for fertilizer...except for bermudagrass.
- All hay crops require soil test and fertilizer application based on soil test requirement.

Kleingrass Toxicity

- **Saponins** in the grass causes liver damage in **horses, sheep and goats**, with accompanying secondary photosensitization in small ruminants.
- **Green** growth after moisture or grazing is reported to be more toxic than old or dormant growth.

Dallisgrass Staggers

- Seed can become infected with ergot fungus (*Claviceps paspali*) = alkaloid compounds = nervous system impacts = death in severe cases
- Remove cattle when seedheads turn orange or rust colored or when symptoms occur



Warm-season Annuals

- **Can** provide good to excellent cattle performance.
- **Can** provide high quantities of fair to good hay.
- **Are** relatively expensive to use compared with perennial species.
- **Can** accumulate nitrates to toxic levels in hay.
- Sorghums **can** produce prussic acid, which is toxic.

Summary

- Warm-season perennial grasses form the basis for any livestock operation in Texas.
- Bermudagrass species differ in many regards; think about what you need from a variety.
- There are alternative species to bermudagrass which require less fertility inputs.
- **Stocking rates will be reduced** with any alternative forage compared with well-managed bermudagrass.
- Native forages may offer benefits not provided by introduced forages.
 - Improved **wildlife habitat**, reduced input costs, aesthetics, increased plant and wildlife **species diversity**.

Think forage...





Bluestems Beyond the Field

Dr. Megan Clayton

Dr. Bob Lyons

Extension Range Specialists



Confusion

1. King Ranch bluestem (*Bothriochloa ischaemum*)
2. Kleberg bluestem (*Dichanthium annulatum*)
3. Angleton bluestem (*Dichanthium aristatum*)

Does it Matter?



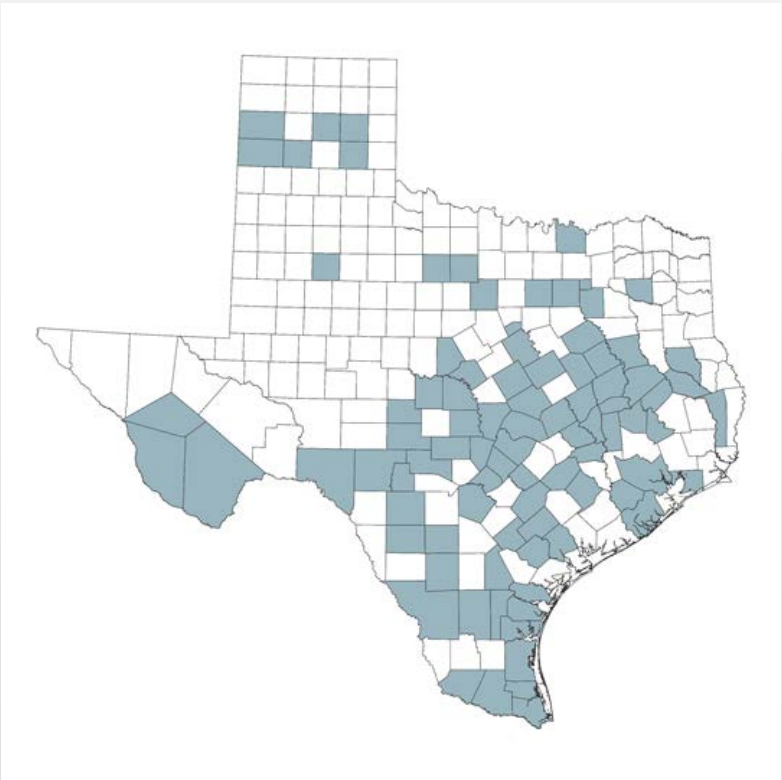
Bluestems Introduced to Texas

SCIENTIFIC NAME	COMMON NAME(S)	ECOTYPES
<i>Bothriochloa bladhii</i> (Retz.) S. T. Blake	Australian bluestem Caucasian bluestem	WW-BDahl bluestem
<i>Bothriochloa ischaemum</i> (L.) Keng	King Ranch bluestem KR bluestem Yellow bluestem	Ganada bluestem Plains bluestem WW-Iron Master bluestem WW-Spar bluestem King Ranch bluestem
<i>Bothriochloa pertusa</i> (L.) A. Camus	Pitted bluestem	—
<i>Dichanthium annulatum</i> (Forssk.) Stapf	Kleberg bluestem Ringed bluestem	T-587 (PMT-587) bluestem Pretoria 90 bluestem
<i>Dichanthium aristatum</i> (Poir.) C.E. Hubb.	Angleton bluestem Awned dichanthium	Gordo bluestem Medio bluestem
<i>Dichanthium sericeum</i> (R. Br.) Camus	Silky bluestem	—

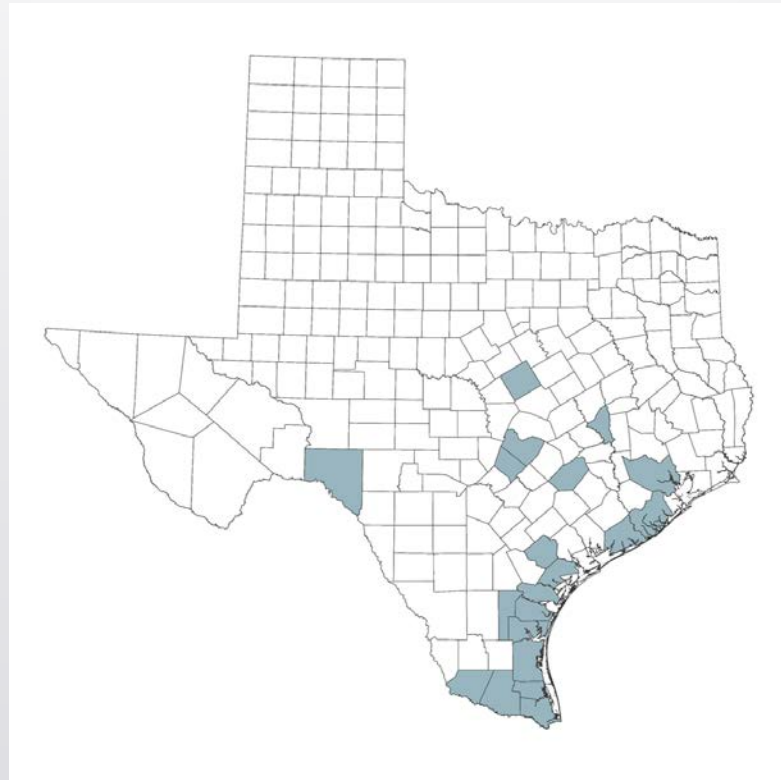


Where are they located?

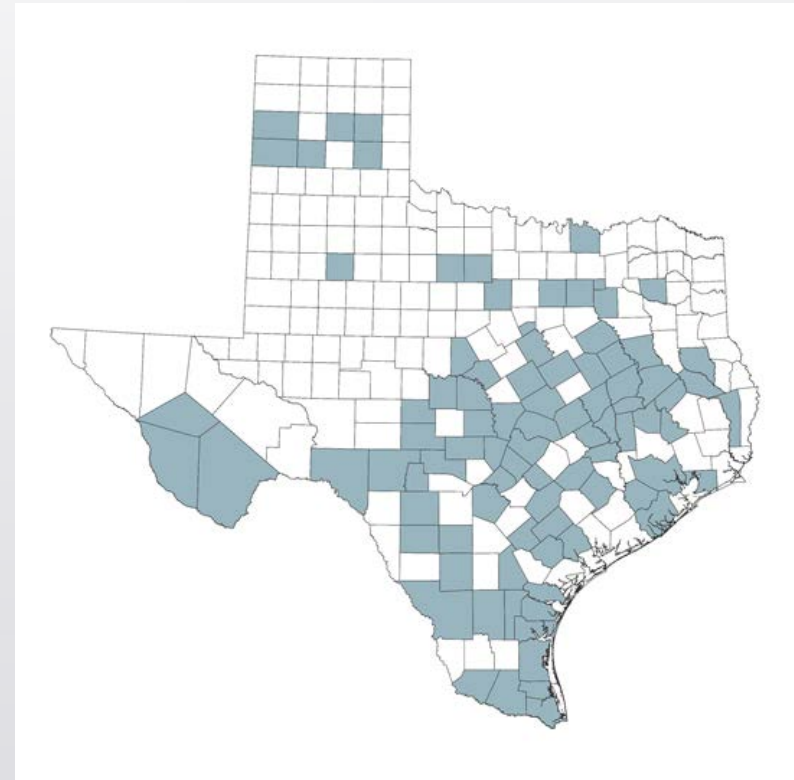
King Ranch



Kleberg



Angleton





Stolons or Rhizomes

- Stolon – a stem that originates at the base of the main stem, grows horizontally ABOVE ground, takes root at various intervals, and produces new plants

Stolon = See

- Rhizome – a stem that originates at the base of the main stem, grows horizontally UNDER ground, and produces new plants

Rhizome = Root

Stolons or Rhizomes

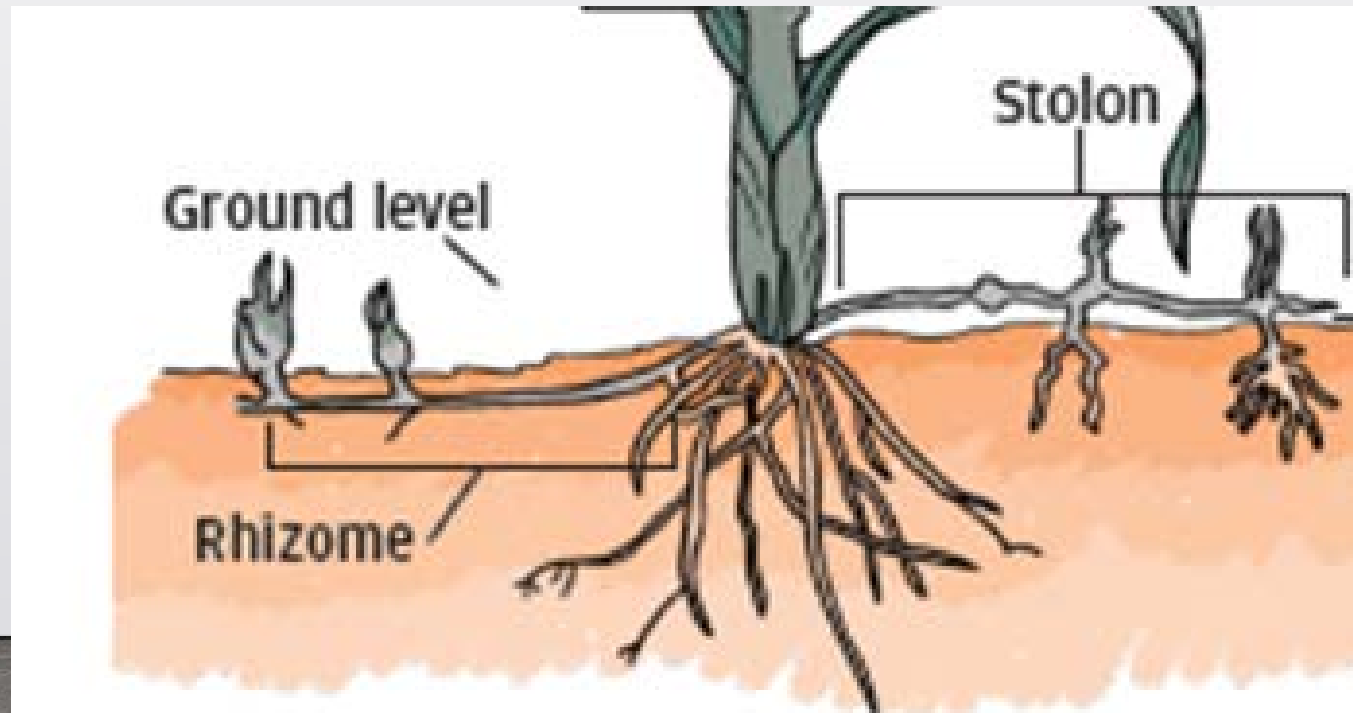
King Ranch

- Stolons OR Rhizomes

Kleberg

Angleton

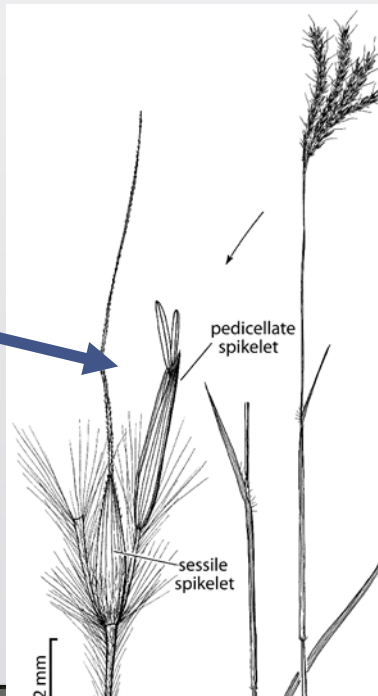
- Stolons



Spikelet Shape

King Ranch

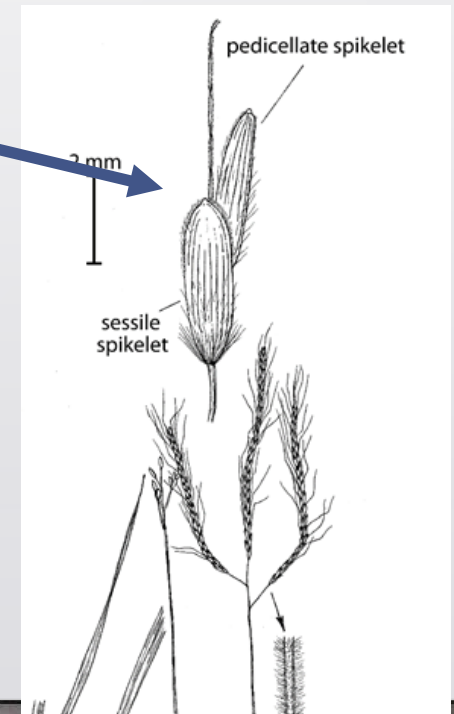
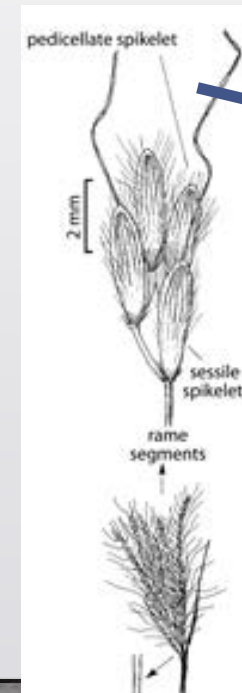
- Sharp



Kleberg

Angleton

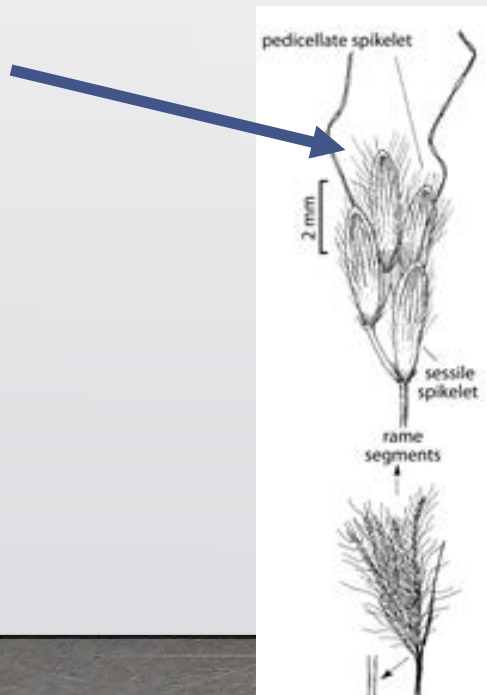
- Blunted



Kleberg from Angleton? Look at the hairs!

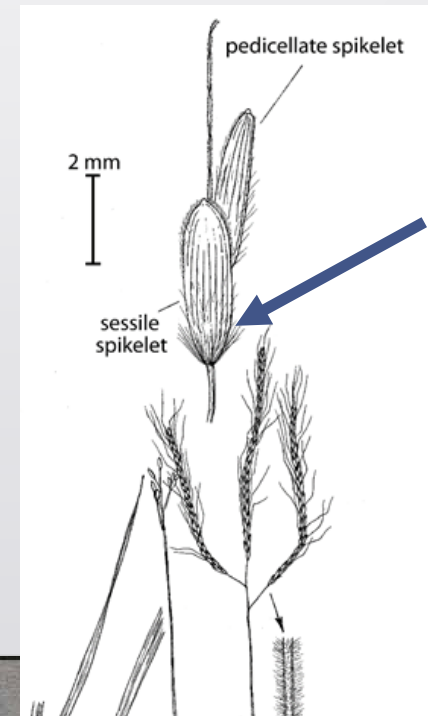
Kleberg

- Long hair towards top of spikelet



Angleton

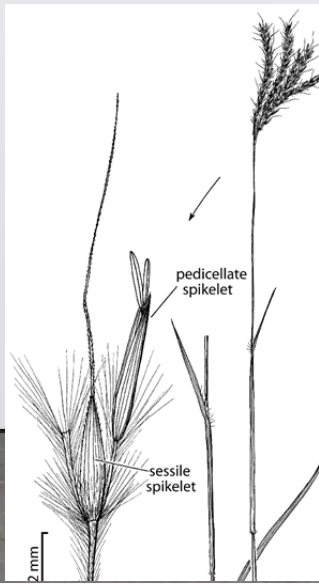
- Long hair on bottom of spikelet



Summary

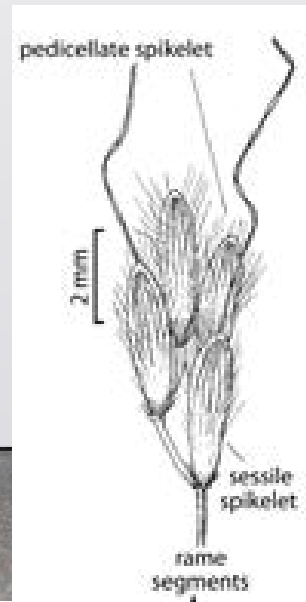
King Ranch

- Sharp spikelet
- Stolons or rhizomes



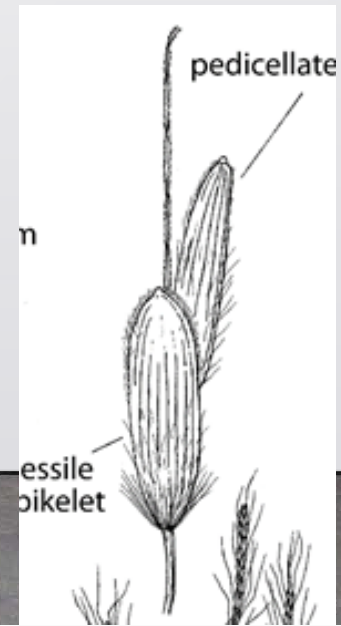
Kleberg

- Blunted spikelet
- Stolons
- Long hair towards top of spikelet



Angleton

- Blunted spikelet
- Stolons
- Long hair on bottom of spikelet



NATIVE SEED SELECTION TOOL





Species selection is important







WARNING
GAS PIPELINE

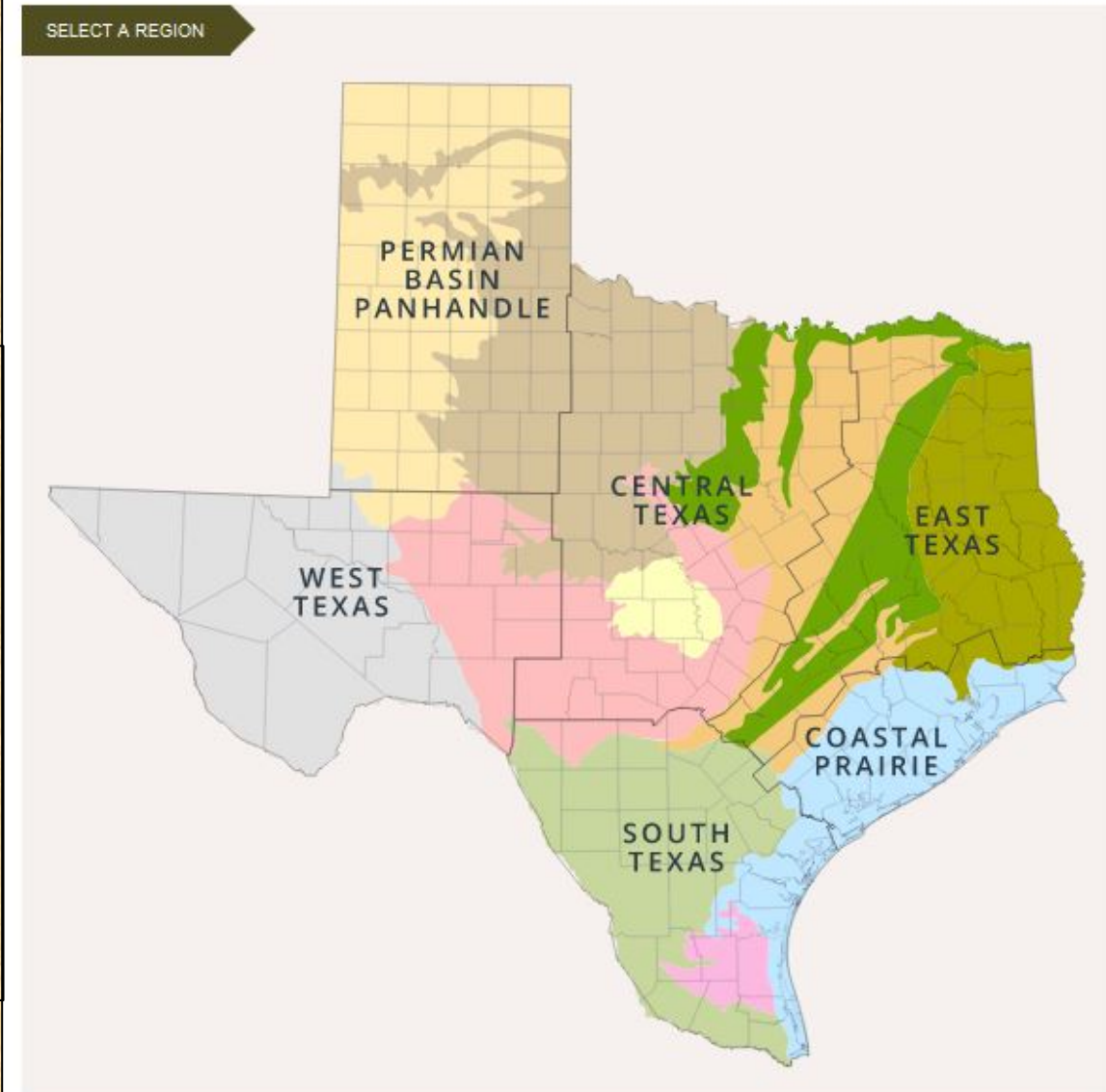




Variety	Species	Variety	Species	Variety	Species	Variety	Species
Plateau	Awnless bush sunflower	Oso Germplasm	halls panicum	Duval Germplasm	red lovegrass	Blackwell	Switchgrass
Venado Germplasm	awnless bush sunflower	Mariah Germplasm	Hooded windmillgrass	Zapata Germplasm	rio grande clammyweed	Cave in rock	Switchgrass
Earl	Big Bluestem	Reno	Illinois Bundleflower	Chet	Sand bluestem	Kanlow	Switchgrass
Kaw	Big Bluestem	Sabine	Illinois Bundleflower	Woodward	Sand bluestem	Atascosa Germplasm	Texas grama
OZ70	Big bluestem	Paloma	Indian Ricegrass	Nueces Germplasm	Sand Dropseed	Arriba	Western wheatgrass
Falfurrias Germplasm	big sacaton	Cheyenne	Indiangrass	Bend	sand lovegrass	Barton	Western Wheatgrass
Nogal	Black grama	El Reno	Indiangrass	Welder Germplasm	Shortspike windmillgrass	Webb Germplasm	whiplash pappusgrass
Appar	Blue Flax	Lometa	indiangrass	Showy	Showy tick trefoil	Nueces Germplasm	Sand Dropseed
Alma	Blue Grama	Aldous	Little bluestem	El Reno	Sideoats grama	Bend	sand lovegrass
Hachita	Blue Grama	Camper	Little Bluestem	Haskell	Sideoats grama	Welder Germplasm	Shortspike windmillgrass
Lovington	Blue Grama	Carrizo blend	Little Bluestem	Niner	Sideoats Grama	Showy	Showy tick trefoil
Catarina blend	Bristlegrass	Cimarron	Little bluestem	South Texas	Sideoats grama	Plains Germplasm	Prairie acacia
Sharps Improved	Buffalograss	OK Select	Little bluestem	South Texas Germplasm	sideoats grama	Rio Grande Germplasm	prairie acacia
SWI1001	Buffalograss	Aztec	Maximillian sunflower	Vaughn	Sideoats grama	Goshen	Prairie sandreed
Texoka	Buffalograss	Cache	Meadow Brome	Dilley Germplasm	Slender grama	Balli Germplasm	prostrate bundleflower
Timeless	Buffalograss	Cicer	Milkvetch	First Strike	Slender Wheatgrass	Kinney Germplasm	false rhodes grass
TopGun II	Buffalograss	Hidalgo Germplasm	multiflowered false rhodes grass	Ramadero Germplasm	spike lovegrass	Viva	Galleta
Beewild	bundleflower	Goliad Germplasm	orange zexmenia	Sodar	Streambank Wheatgrass	Lodorm	Green needlegrass
Lavaca	Canada wildrye	Potomac	Orchardgrass	Alamo	Switchgrass	Van Horn	Green Sprangletop
Mandan	Canada wildrye	Profile	Orchardgrass	Kaneb	Purple prairie clover	Woodward	Sand bluestem
redriver	Crabgrass	Quick Draw	Orchardgrass	Duval Germplasm	red lovegrass	Maverick Germplasm	pink pappusgrass
Garrison	Creeping Foxtail	Comanche	Partridge pea	Zapata Germplasm	rio grande clammyweed	Eldorado	Engelmann daisy
PMK - 24	Eastern Gamagrass	Lark	Partridge pea	Chet	Sand bluestem	87 varieties	267 VNS

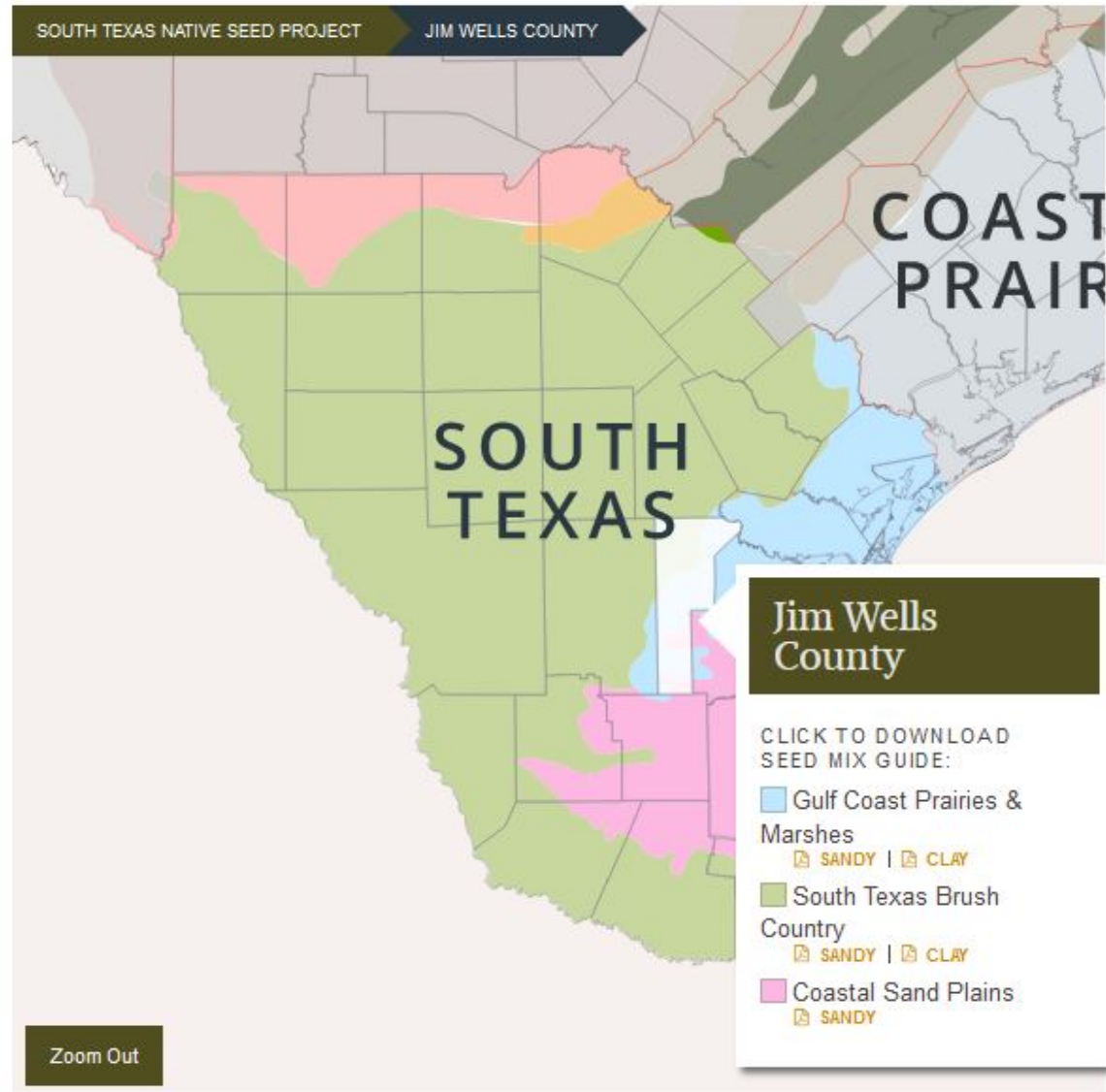
Texas Native Seeds (CKWRI) Seed mix map

<https://www.ckwri.tamuk.edu/research-programs/texas-native-seeds-program-tns/native-seed-selection-tool>



Texas Ecoregions

- | | | |
|-------------------------------|---------------------|-----------------|
| Blackland Prairies | Coastal Sand Plains | Edwards Plateau |
| Gulf Coast Prairies & Marshes | High Plains | Llano Uplift |
| Oak Woods & Prairies | Piney Woods | Rolling Plains |
| South Texas Brush Country | Trans Pecos | |



Texas Ecoregions

- Blackland Prairies
- Gulf Coast Prairies & Marshes
- Oak Woods & Prairies
- South Texas Brush Country
- Coastal Sand Plains
- High Plains
- Piney Woods
- Trans Pecos
- Edwards Plateau
- Llano Uplift
- Rolling Plains

Jim Wells County

CLICK TO DOWNLOAD SEED MIX GUIDE:

Gulf Coast Prairies & Marshes

SANDY | CLAY

South Texas Brush Country

SANDY | CLAY

Coastal Sand Plains

SANDY



Native Seed Mix Recommendation
 South Texas Brush Country Ecoregion
 Clay Soil

Seed Variety	% of Mix	Planting Rate (Lbs. PLS/ac.)
Atascosa Germplasm Texas grama ^{1,2}	10%	0.50
Catarina Blend bristlegrass ^{1,2}	10%	0.30
Falfurrias Germplasm big sacaton ²	5%	0.05
Guadalupe Germplasm white tridens ^{1,2}	5%	0.05
Hidalgo Germplasm multiflower false rhodes grass ²	5%	0.05
Kinney Germplasm false Rhodes grass ²	5%	0.05
La Salle Germplasm Arizona cottontop ^{1,2}	10%	0.20
Mariah Germplasm hooded windmillgrass ^{1,2}	10%	0.10
Maverick Germplasm pink pappusgrass ^{1,2}	10%	0.30
Oso Germplasm Hall's panicum ^{1,2}	10%	0.10
South Texas Germplasm sideoats grama ^{1,2}	10%	0.75
Webb Germplasm whiplash pappusgrass ^{1,2}	10%	0.30
Total	100%	2.75
Forbs and Legumes to include in addition to grasses if desired		
Balli Germplasm prostrate bundleflower ^{1,2}	5%	0.15
Goliad Germplasm orange zexmenia ²	5%	0.30
Rio Grande Germplasm prairie acacia ^{1,2}	5%	0.25
Venado Germplasm awnless bushsunflower ²	5%	0.15
Zapata Germplasm Rio Grande clammyweed ²	5%	0.40

Licensed Seed Vendors:

¹Bamert Seed Company: 1-800-262-9892

²Douglass W. King Seed Company: 1-210-661-4191

³Turner Seed Company: 1-800-722-8616

For substitutions or technical guidance:

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- COASTAL PRAIRIES

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- WEST TEXAS

- Colin Shackelford
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- colin.shackelford@tamuk.edu

- EAST TEXAS

- Tyler Wayland
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- tyler.wayland@tamuk.edu

- PANHANDLE/PERMIAN

- Sam Lutfy
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My “Big 4”

1. Switchgrass
2. Johnsongrass
3. Kleingrass
4. Guinea grass

Dr. Megan Clayton

Dr. Barron Rector

Extension Range Specialists



1. Switchgrass *Panicum virgatum*

- Only Native
- Good grazing
- Decreases with heavy grazing



2. Johnsongrass *Sorghum halepense*

- Native to Turkey, spread across most of southern US
- Weed in cultivated fields, ditches
- Forage and erosion control
- Toxic accumulations: Cyanide in freshly frosted plants, nitrates after fertilization and during drought

3. Kleingrass

Panicum coloratum

- Good grazing
- May cause photosensitization in horses, sheep and goats
- Seeds for birds?



4. Guinea grass *Megathyrsus maxima*

- Native to Africa
- Creeping rhizomes
- Fire ladder and creates high intensity



Photographer: Steve Conklin
Source: Rio Grande Valley Invaders

Seed Head



Seed Head



- SWITCH: seeds mostly on short stalks; may have purple tinge; 6-24" long
- JOHNSON: often long awns; seeds much bigger than the others; 8-16" long
- GUINEA: seeds bigger than Klein, but equal or bigger than Switch; 1.5-16" long
- KLEIN: smallest seed; 3-10" long

Plant Height

- SWITCH: 3-8', can be over 10'
- JOHNSON: 2-6.5', shorter on dry sites
- GUINEA: up to 8'
- KLEIN: up to 4.5-6'



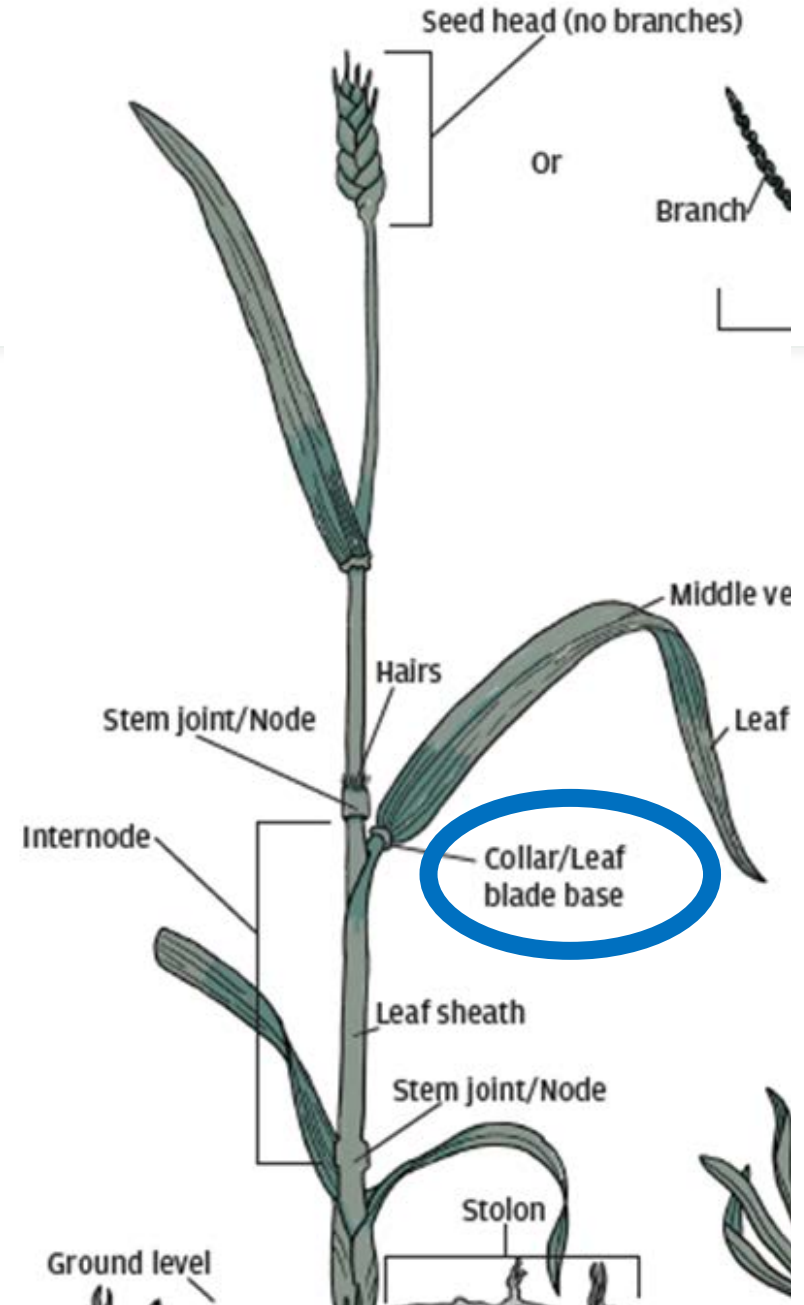
Stems

- SWITCH: straight up; **very hollow**
- JOHNSON: straight up; big, store sugar; **indented at bottom** (even 2-3" up)
- GUINEA: straight up; very thin, but do not fall down right away
- KLEIN: straight or at an angle, **thin and weak**, even falling while still green



Leaf

- SWITCH: yellow-green color; tapers at end
- JOHNSON: prominent **white midvein** (back); endophyte fungus making **red/purple blotches**; leaf edge sharp
- GUINEA: sheath collars have lots of hairs, leaves weep over; usually shortest leaf
- KLEIN: can be bluish; flat or rolled edges; **white midvein on lower part of the leaf**; has **glands/pimples on side of leaf** (bottom 1/5 of leaf only) with a hair coming out of it; sharply pointed



—

What is this?

1. Switchgrass
2. Johnsongrass
3. Kleingrass
4. Guinea grass



What is this?

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Thank You
for participating

Please complete the survey at:
<https://www.surveymonkey.com/r/J9KMNKD>

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