

## Texas herbage seed production in contrasting climates

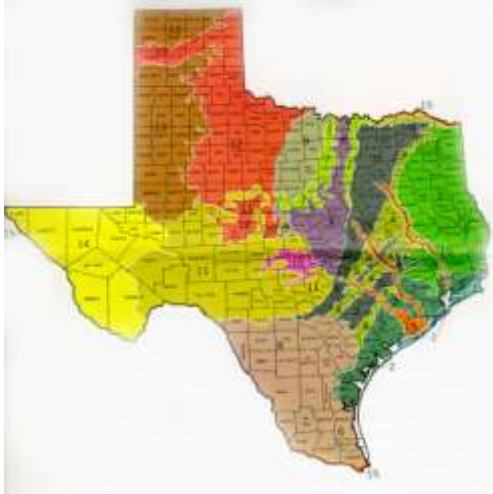
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### Abstract

Texas is a large state with diverse soils, rainfall, and growing seasons. Rainfall ranges from 200 to 1400 mm and the frost free growing season from 185 to 320 days. There are 15 distinct land resources areas in Texas. Lack of a consistent dry period for seed maturation and harvest is the main factor for limited grass and legume herbage seed production in Texas. The small amount of herbage seed production in Texas is primarily introduced and native warm-season perennial grasses grown in South and West Texas where annual rainfall is low and irrigation is available. The Natural Resources Conservation Service, a federal agency, collects, evaluates, and increases seed of native plants at 27 plant material centers. Three are located in Texas. Registered and certified planting material of Tifton 85 bermudagrass and turf grasses are also produced in Texas.

Texas is a large and diverse state. It is 1288 km from the northern tip to the southern tip and 1244 km from the eastern edge to the western edge. Soils range from poorly drained clay soils in southeast Texas where rice (*Oryza sativa*) is grown to deep sandy soils in East Texas. The southern tip of Texas has a tropical climate and is in the USDA Plant Hardiness zone 9b (average minimum temperature of -1.2 to -3.8<sup>0</sup>C) with an average growing season of 320 days. In contrast the northwest tip of Texas is in the USDA Plant Hardiness Zone 6a (average minimum temperature of -20.6 to -23.3<sup>0</sup>C) with an average growing season of 185 days. Average annual rainfall ranges from 1400 mm on the eastern edge and decreases moving west to 200 mm on the western edge. Rainfall generally peaks in spring and is low in mid to late summer. However rainfall is very erratic from year to year. Any part of Texas can be in a drought or have a flood any month of the year. Forage producers in South Texas describe the rainfall pattern as prolonged drought interrupted by periodic floods. Many cool- and warm-season agriculture crops and forages are grown in Texas due to the wide combination of soils, rainfall, and temperature.

*Land Resource Areas in Texas*



**Fig. 1. Land resource areas of Texas.**

Grasslands are important in all 15 land resource areas of Texas because livestock production is a major agriculture enterprise (Fig. 1). Among the states, Texas ranks first in number of cattle operations, beef cows, sheep, goats, and horses. A general description of the soils and list of major forage species for each land resource area follows:

1. Coastal Marsh – Saline clay and loam soils in marsh areas on Upper Texas Gulf Coast that is grazed by beef cattle in late-winter and spring.
2. Coastal Prairie – Poorly drained loam and clay soils predominate. Rice is the main crop in the eastern part and corn (*Zea mays* L.), grain sorghum (*Sorghum vulgare* Pers.), and cotton (*Gossypium hirsutum* L.) in the western part. Primary introduced grasses are dallisgrass (*Paspalum dilatatum* Poir.), common bermudagrass (*Cynodon dactylon* (L.) Pers.), and annual ryegrass (*Lolium multiflorum* Lam.). White clover (*Trifolium repens* L.) is grown in wet areas and annual medics (*Medicago* spp.) in the dry areas.
3. East Texas Timberland – Deep sandy acid soils predominate. Native vegetation was soft- and hardwood forest with small open areas of native grasses. Major introduced forages are bermudagrass, bahiagrass (*Paspalum notatum* Flugge), annual ryegrass, rye (*Secale cereale* L.) and annual clovers (*Trifolium* spp.).
4. Claypan (Post Oak) – Thin layer of sandy loam topsoil over claypan. Oak (*Quercus* spp.) trees are common. Bermudagrass, bahiagrass, annual ryegrass, small grains, and annual clovers are the major introduced forages.
5. Blackland Prairie – Characterized by black, calcareous clay soils. Originally it was a native grass prairie that has been converted to cropland for cotton, corn, and grain sorghum production. Major grass genera are *Panicum* spp., *Bothriochloa* spp., *Andropogon* spp., *Bouteloua* spp., and *Eragrostis* spp. Oat (*Avena sativa* L.) is the primary cool-season annual grass. Adapted cool-

season annual legumes are sweetclover (*Melilotus alba* Medik.), rose clover (*Trifolium hirtum* All.), and berseem clover (*Trifolium alexandrinum* L.)

6. Rio Grande Plain – Sandy loam soils with moderate fertility. The area is primarily rangeland consisting of native grasses, forbs, and legumes. Overgrazing has led to invasion of brush species like mesquite (*Prosopis* spp.). Most of the area is managed for wildlife and beef cattle.

7. Cross Timbers and 8. Grand Prairies – Soils are neutral to slightly acid and sandy. Topography is rolling to hilly. Oak tree species predominate with mid- to short native grasses. Main introduced grasses are hybrid bermudagrasses and wheat (*Triticum aestivum* L. subsp. *aestivum*) that is grown for forage and grain.

9. North Central Prairies – Moderately deep to deep soils with loamy surface soils and clay subsoils. Native warm-season perennial grasses predominate and wheat is grown for grain and forage.

10. Central Basin and 11. Edwards Plateau – Shallow stony to gravelly clayey soils. Topography is rolling to hilly. Native grasses predominate. Cedar (*Juniperus* spp.) and Shinner oak (*Quercus mohriana* Buckl.) are common. This area is a major sheep and goat production area.

12. Rolling Plains – Shallow to moderately deep soils with loamy surface layers over clay, loam, or limestone. Mostly rangeland with native grasses and forbs. Wheat and cotton are grown.

13. High Plains - Sandy and loamy soils predominant. Major crop production area, especially cotton. Rangeland is composed of native grass and forbs.

14. Trans-Pecos – Mostly nearly level sand, loam, or clay soils. Rangeland is native grasses, forbs and shrubs. Some irrigated cotton production. Salinity is a problem.

15. Bottomlands – Loam to clay loam fertile soils that are moderately to poorly drained. Moderately drains are soils used for vegetable and crop production and poorly drained soils used for pasture. Major forage species are dallisgrass, bermudagrass, and white clover.

### *Texas Herbage Seed Production*

There is a substantial acreage of small grains grown in Texas. They are planted in autumn and harvested in late spring to early summer. Foundation, registered, and certified seed of oat, wheat, and triticale (X *Triticosecale* Wittmack) are produced in Texas. Lack of a consistent dry period for seed maturation and harvest is the main factor for limited grass and legume herbage seed production. The small amount of herbage seed production in Texas is primarily introduced and native warm-season perennial grasses grown in South and West Texas where annual rainfall is low and irrigation is available. The only certified herbage seed production at this time is buffelgrass [*Pennisetum ciliare* (L) Link.], Burr medic (*Medicago polymorpha*), and Little burr medic (*Medicago minima*). Seed from planted and natural stands of native grasses is harvested

by land owners. Seed yields are low because of indeterminate growth resulting in seedheads at various stages of maturity. Because of poor quality and low germination they are sold on a pure live seed basis.

The Natural Resources Conservation Service is a federal government agency that works hand-in-hand with producers to improve and protect their soil, water, and other natural resources. One component of the NRCS are 27 plant materials centers located throughout the United States that cooperate with state and Federal agencies, commercial businesses, and seed and nursery associations. The purpose of the program is to provide native plants that can help solve natural resource problems. Beneficial uses for which plant material may be developed include biomass production, carbon sequestration, erosion reduction, wetland restoration, water quality improvement, streambank and riparian area protection, coastal dune stabilization, and other special conservation treatment needs. Staff at the plant material centers look for plants that show promise for meeting an identified conservation need and test their performance. They maintain Foundation Seed of cultivar releases that are distributed by the Texas Foundation Seed Service to commercial seed growers.

There are three plant materials centers located in Texas (Fig. 2). The Nacogdoches location serves East Texas, western Louisiana, southwest Arkansas, and southwestern Oklahoma. The Kingsville location serves South Texas, and the Knox City location serves the Southern Great Plains area in Texas and Oklahoma.



Fig. 2. Natural Resource Conservation Service plant material centers in Texas.

The most prominent grass species in eastern Texas and the southeastern US are hybrid bermudagrass [*Cynodon dactylon* (L.) Pers.] cultivars. All hybrid bermudagrass cultivars must be established vegetatively because only 3 to 5 % of the seed is viable. Specialized equipment has been developed for the digging and planting of sprigs (parts of the lower stem, stolons, rhizomes, and roots). Sprigs are sold by the bushel (2.84 hectoliter), with a recommended planting rate of 30 to 40 bushels/acre (34 to 46 hl ha<sup>-1</sup>). Registered and certified sprigs of 'Tifton 85' bermudagrass are produced and sold in Texas. Production of turf sod for urban areas is also a major industry in southeast Texas. Foundation, registered, and certified sod of bermudagrass, buffalograss [*Buchloe dactyloides* (Nutt) Engelm.], centipede grass [*Eremochloa ophiuroides* (Munro) Hack.], St. Augustine grass [*Stenotaphrum secundatum* (Walt.) O. Ktze], and zoysia (*Zoysia* spp.) are produced in Texas.

### **Summary**

Seed yields of forage grasses and legumes grown in Texas are generally low because there is not a predictable wet and dry season. Indeterminant growth of perennial grasses and seed shattering of legumes are additional problems. Seed yields of native perennial grasses are low but can be profitable for landowners some years because of no cost inputs except harvesting and cleaning the seed.