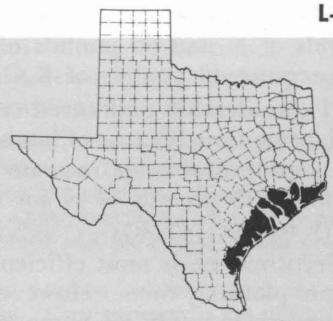
FACT SHEET

L-881

KEYS TO PROFITABLE GRAIN SORGHUM PRODUCTION IN THE COAST PRAIRIE AND COASTAL BEND



Grain sorghum is grown extensively throughout the Coastal Bend. The average rainfall is about 28 inches, but its variable distribution makes grain sorghum more reliable than corn.

Grain sorghum is grown primarily in the western half of the Coast Prairie and corn competes for some of the grain acreage in the central section. Average rainfall increases to some 56 inches in the eastern counties, causing surface drainage on the many nearly level soils to be a problem. Here, too, rainfall distribution often is variable.

Cropping Sequence

A farming system that avoids growing the same crop on a field in succeeding years helps to reduce disease, insect and weed problems. Residue from grain sorghum helps soil physical condition. Suitable systems vary for individual farms. Two-year rotations of grain sorghum and cotton are favored in much of the area. Flax could be used in more rotation in the western sections and would permit Johnsongrass eradication during the long fallow period following harvest. Longer term rotations have shown advantages where livestock is available. Farm program regulations may offer opportunities to grow soil-improving crops on diverted acreage. One such rotation could be oats - hubam sweetclover for 1 or 2 years, followed by cotton, and then grain sorghum. Plow hubam out each year as soon as blooming starts to avoid a weed problem with volunteer crops. On some Coast Prairie soils, longer rotations using Dallisgrass - white clover in the system may be considered.

Keep records on the location of crops since chemical residues may require changes in the system.

Seedbed Preparation

Begin seedbed preparation after harvesting the previous crop to allow more time to store soil moisture, decay crop residue, apply fertilizer and let the soil become firm for planting.

Such operations include: (1) shred stalks of a previous row crop promptly; (2) chisel, disk, plow or bed to stop crop and weed growth and to mix the plant residue in the soil; (3) complete steps needed for surface drainage; (4) bed land by early fall and complete rebedding by December; and (5) control winter weeds with chemicals or by row disk to avoid disturbing the seedbed.

Forming a raised flat surface with bed shapers before planting may improve stands and seedling growth since it permits use of precision planters and results in a better drained, warmer seedbed. Herbicides usually are required with this technique.

Fertilization

Balanced fertility is essential for highest yields and water use efficiency, plus growth to maturity in a normal time interval. The wide range of soils, rainfall and management practices requires tailoring fertilizer applications for each field situation. The best guide is a soil test recommendation obtained from a reliable laboratory that can correlate the amount of available nutrients in the soil with local fertilizer research and farm trials. The amount of fertilizer needed depends upon the level of the available nutrient in the soil and yield potential as influenced by other factors. The laboratory should receive a representative soil sample plus general soil description and cropping information.

If a soil test is not available, some general considerations on needs at 3,500 to 4,500-pound yield levels include:

Coastal Bend soils, often low in nitrogen and phosphorus, may need about 40 pounds of N and 30 pounds of P_2O_5. Very few need potassium (K_2O) at this production level.

Most ***Coast Prairie*** soils are low in nitrogen and phosphorus. Sandy soils may be low in potassium also. Some 60 pounds of N, 40 pounds of P_2O_5 and 40 pounds of K_2O may be needed on deficient soils.

Prepared by Texas Agricultural Extension Service specialists headquartered at College Station and Weslaco, with supporting contributions by certain county agricultural agents; and by Texas A&M University research staff at College Station, Beaumont, Angleton and Beeville.

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Some soils in the Coast Prairie need lime to correct acidity.

The ***Bottomlands*** usually need about 60 to 80 pounds of N and 60 pounds of P_2O_5. Some soils may require 40 pounds of K_2O.

If considerable undecayed crop residue remains at planting time because of late seedbed preparation or a high residue crop, increase the nitrogen application by 15 pounds of N for each estimated ton of dry residue per acre.

Fertilizer use is most efficient when application is near planting time. However, it may be easier or cheaper to apply on many soils in the late fall before rebedding or in early winter in the sides of beds with chisel or sweep applicators. Apply anhydrous ammonia 2 or more weeks before planting or as a sidedressing. Nitrogen and some potassium may leach in sandy soils and some nitrogen may be lost to the air on poorly drained soils.

Place N and K_2O 4 inches to the side and 4 inches below where the seed will be. P_2O_5 near or in contact with seed may improve production in a cold wet spring. If sidedressing is needed, apply within 2 to 4 weeks after emergence near the side roots. Place anyhdrous ammonia midway between the rows.

Iron-deficient areas in Coastal Bend soils may need two to three foliage sprays of iron sulfate at 10 to 14-day intervals. Zinc deficiencies occur on some Coast Prairie soils. Soil applications of zinc sulfate or chelate can be used.

More information on fertilizer and soil testing is available from county agricultural agents.

Seed

Since seed is a low production cost item, purchase only that of best adapted hybrids with high germination, vigorous seedling growth and a minimum of off-types. Seed produced by reliable seedsmen and properly treated with a fungicide and insecticide is the best assurance of meeting these requirements.

Select a hybrid based on previous performance under local or similar conditions. Ask your county agent about hybrids grown in local trials and in Texas Agricultural Experiment Station tests. Yield, standability, tolerance to diseases and maturity requirements are important considerations. Later maturing hybrids have a higher yield potential under good moisture conditions and normal planting dates. However, earlier maturing hybrids often are favored under the usual rainfall distribution, especially if planting is delayed or moisture is short at planting.

Planting

Plant near the average frost date when the soil temperature at about 7 a.m. reaches 55 degrees F. This ranges from late February to mid-March in the Coastal Bend, and March 1 to April 5 in the Coast Prairie.

Use 1 pound of seed for each 700 pounds of expected yield per acre, regardless of row spacing. Plant about 1½ inches deep in moist soil. On medium to fine-textured soils, firm the drill row by lightly rolling to conserve moisture and insure germination.

Higher yields may be produced with row widths averaging 30 inches or less if weed control and other cultural practices can be performed properly. Shaped beds and precision planters are especially desirable where two rows per bed are planted.

Stubble Cropping

Stubble cropping grain sorghum sometimes is considered because of relatively low production costs on a second crop. However, insects may be a problem. Rainfall is often limited and yields are less predictable. About 200 days are required from planting to harvest of the second crop which may delay seedbed preparation for the next year.

Some procedures for stubble cropping are: (1) if needed, apply enough phosphorus and potassium for both crops; (2) after first harvest, cultivate to control weeds and apply nitrogen at least 10 inches away from the row; (3) shred the stalks to a height of 3 inches; and (4) check the field for insects and control if necessary.

Irrigation

High-yield grain sorghum uses 18 to 20 inches of water during the growing season. This may be supplied from moisture stored in the root zone, rainfall or irrigation. Adequate moisture is necessary during the critical stages of boot, bloom and soft dough.

Roots of mature sorghum plants can penetrate 4 to 6 feet in deep, permeable soil, but may be shallower in less favorable conditions.

Preplanting irrigation may be used if rainfall has not filled the root zone. When surface moisture is present for good germination, water for early growth may be applied after emergence. Apply only enough water to fill the soil root zone.

During the growing season, apply water whenever 50 to 60 percent of moisture in the root zone has been used or irrigate for ample moisture during the early boot to soft dough stages. Rainfall, soil texture, rooting depth and climatic conditions will determine the number of irrigations, the interval between them and the amount per irrigation. Lighter, more frequent irrigation is required for sandy soils and for shallow soils.

Figure 1 shows the daily water use by grain sorghum. Daily water use begins to increase at

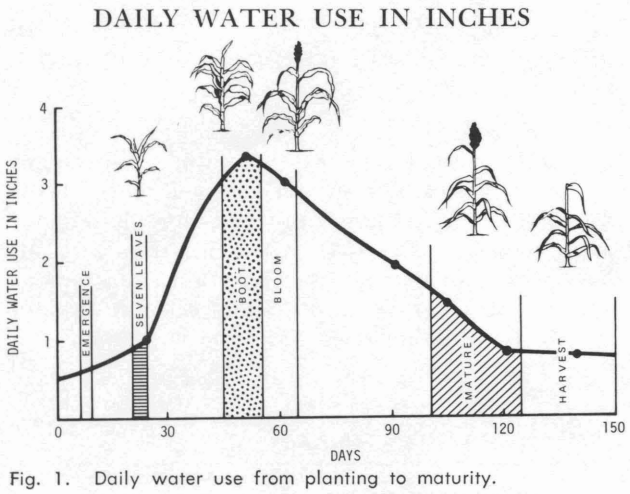

Fig. 1. Daily water use from planting to maturity.

the seven-leaf stage and may be 0.30 inch per day during the boot to grain formation stages. More information on irrigation is available from your county agricultural agent.

Weed Control

Grass and broad-leaved weeds reduce sorghum yields and may interfere with harvesting. Satisfactory control is possible by proper seedbed preparation and timely shallow cultivation. Herbicides may be required to control certain weeds, or where rainfall prevents prompt tillage. In selecting herbicides, consider (a) label clearances, (b) effectiveness on specific weeds, (c) effect on sorghum, nearby crops and following crops and (d) cost.

General topics on herbicides follow. More information is available from your county agent.

Before planting — *Johnsongrass.* After previous crop, broadcast or spot spray with Dalapon when Johnsongrass is 8 to 12 inches tall. If applied near planting, row disk beds 3 days later and wait at least 18 days to plant,

Annual broad-leaved winter weeds. Apply 2,4-D type herbicides when weeds are small and at least 3 weeks before planting.

At planting — *Annual broad-leaved* and *grass weeds.* Use Herban, Milogard or combinations of Milogard with Herban or Lorox. Combinations may give better control of large seeded grasses. Do not use on sands or loamy sands. Band applications are cheaper and may leave less residue than if broadcast. Fall crops can follow Herban but not Milogard. See B-1029 concerning spring crops.

After planting — *Broad-leaved weeds* and *some small-seeded grasses.* AAtrex, with a surfactant or a non-toxic oil added, can be used 3 weeks after sorghum emergence to control small (2-inch) weeds except on sand or loamy sand soils. Residue limits next crop to sorghum or corn.

Broad-leaved and *grass weeds.* Use Karmex with a surfactant as directed spray to small weeds after the crop is 15 inches tall, regardless of soil texture.

Broad-leaved weeds. Use 2,4-D after the crop is 6 inches tall and before flowering. Use salt formulations with a low vapor hazard, use precautions against spray drift and comply with restrictions in regulated counties. Banvel can be used during 10 to 25 days after sorghum emergence. At recommended rates, it is less hazardous to nearby crops than 2,4-D.

Insects

Description of the more common insects that may attack grain sorghum in this area and some principles of control follow. Additional information on their identification, life history and control is available from your county agent.

Sugarcane borer (most common borer in this area) and *southwestern corn borer* larvae feed within crown and stalk, causing stunting, lodging and yield loss. Plant early to avoid late-season buildups. Apply insecticides when 25 percent of plants show injury. Shred and plow under stalks promptly after harvest.

Corn earworms and *sorghum webworms* feed on developing and maturing grain. Corn earworm is cannibalistic and insecticides often are not needed. Plant early to avoid late-season buildups. Check plants frequently after heading. Apply insecticides when necessary.

Fall armyworm larvae feed on seedlings and in the whorl during preboot stage, causing leaf ragging and "buck shoting." Apply insecticides when stand or bud damage is threatened.

Aphids suck plant juices. Severity of damage depends upon plant size, kind and number of aphids, parasites and predators. The yellow sugarcane aphid and greenbug may cause losses from the seedling through grain formation stages. The corn leaf aphid sometimes causes seedling loss. Use Extension publications for detection and control information.

Sorghum midge adult deposits eggs in florets at blooming time. Larvae consume developing seeds, resulting in "blasted" heads. Plant early to avoid late-season buildups. If midge are present and damage is expected, begin insecticide applications when about 50 percent of heads begin blooming.

Soil insects (seed-corn maggot, corn rootworms, wireworms, cutworms) in larval stages feed on seeds, seedlings, roots or stems of sorghum. Preplant soil application is the most effective control, but seed furrow treatment often is satisfactory. Treatments on seedlings may control cutworms.

Other insects (chinch bug, false chinch bug, stinkbug, flea beetle) occur in local areas. Chinch bugs suck juices from young plants. Flea beetles chew holes in leaves. Stinkbugs and false chinch bugs suck juices from developing grains. Apply insecticides when populations reach damaging levels.

Diseases

Description of the more common diseases that damage sorghum in this area and control principles follow. Information on disease reactions of hybrids is available from your county agent. For best results, use a combination of suggested control practices.

Seed rots and *seedling disease* are caused by several fungi and bacteria. The recommended seed treatment fungicides used by seedsmen usually give protection, but keep crop residue out of seeding zone and use crop rotation.

Downy mildew, caused by a fungus, has symptoms including striping of leaves, sterility on systemically infected plants and down-like appearance on lower leaf surface. Rotate with nonrelated crops. Use tolerant hybrids.

Maize dwarf mosaic gives a typical chlorotic mottle on upper leaves and a red leaf symptom on highly susceptible sorghums. Susceptible plants are stunted and yield less if infected within 45 days after emergence. The virus overwinters in rhizomes of Johnsongrass and is transmitted by insects. Control Johnsongrass in and around field. Use tolerant hybrids.

Head smut, caused by a fungus, produces smut galls on the stalk and heads are sterile. Use resistant hybrids. Rotate with crop not related to sorghum.

Charcoal rot causes shredded stalk interior near ground level, poor seed development and stalk lodging. Infection by the fungus is likely when drouth stress occurs near heading. Other stalk rots may be damaging. Conserve moisture and mature crop before usual drouth periods.

Anthracnose, caused by a fungus, forms circular to oval spots on leaves. Neck and stalk rots occur if the fungus penetrates the stalk. Use tolerant hybrids and crop rotation where the problem exists.

Leaf spots and *rust,* caused by several fungi and bacteria species, produce spots, stripes, pustules or streaks on leaves depending on causal organism. Use crop rotation.

Nematodes stunt the root system, resulting in poor uptake of water and nutrients. Rotate with crops which do not host the nematode involved.

Desiccants

In some situations, a desiccant to kill leaves on sorghum or grass and certain broad-leaved weeds may help dry the grain faster or reduce harvesting problems with vegetation. Desiccants presently available for grain sorghum used as feed or food usually do not kill the stalks.

Sodium chlorate may be applied up to 6 pounds per acre of active ingredient when the sorghum is fully mature and 7 to 10 days before harvest. Four pounds usually are sufficient for desiccation of sorghum and grass. Nitrogen solutions may be applied at a minimum of 30 pounds of total nitrogen per acre. Add a wetting agent. With either material, use 5 to 10 gallons of solution per acre for aerial applications and 20 gallons per acre with ground equipment.

Harvesting

Harvest when moisture in the grain has reached a proper level for available handling facilities. Delay means losses. Acceptable moisture for storage is 13 percent. The grain may be harvested up to 18 percent moisture if drying facilities are available.

The combine operator should follow the manufacturer's manual for proper combine adjustment to avoid waste. Trash and cracked grain favor stored grain insects plus moisture accumulation and mold damage. Practice good sanitation with all harvesting and storing. Protect grain from rodents and insects. More information on drying and storing is available from your county agent.

Estimated Yield, Income, Costs and Income Over Specified Costs Per Acre

Yield—pounds per acre	4,000
Price—per cwt.	$ 1.75
Income—Per acre[1]	$70.00
Preharvest costs per acre	
Seed	$ 1.30
Fertilizer	9.60
Herbicide	4.00
Machinery	4.24
Labor	4.34
Interest on operating capital	.94
Total specified preharvest costs	$24.42
Harvest costs per acre	
Combining—custom	$ 5.25
Hauling—custom	3.50
Total specified harvest costs	$ 8.75
Total specified costs	$33.17
Income over specified costs[2]	$36.83

[1]Does not include any government payments.

[2]Costs do not include unallocated overhead costs such as interest, taxes and insurance on farm real estate and machinery, depreciation on farm buildings and machinery and pickup expense.

Cultural Practices, Usual Dates, Times Over, Hours Per Acre, Cost Per Hour and Cost Per Acre of Grain Sorghum

Cultural practice	Usual date	Times over	Hour per acre		Cost per hour		Cost per acre	
			Labor	Mchy.	Labor	Mchy.	Labor	Mchy.
Shred stalks	Aug.	1	.28	.25	$1.30	$1.24	$ .36	$ .31
Disk	Aug.	1	.36	.33	1.30	1.32	.47	.44
Bed	Sept.	1	.36	.33	1.30	1.56	.47	.51
Rebed	Nov.	1	.36	.33	1.30	1.56	.47	.51
Fertilize	Dec.	1	.36	.33	1.30	1.28	.47	.42
Row disk	Dec.	1	.28	.25	1.30	1.56	.36	.39
Plant	Mar.	1	.36	.33	1.30	1.56	.47	.51
Apply herbicide	Mar.	1	.15	.1	1.30	1.31	.20	.13
Roll	Mar.	1	.09	.08	1.30	1.19	.12	.10
Cultivate	Apr.-May	2	.73	.66	1.30	1.39	.95	.92
Harvest			Custom					
Total			3.33	2.99			$4.34	$4.24

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