2008 Sorghum for the Texas South Plains:
Agronomy, Hybrids, Bugs, Weed Control, and More

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Grain & Forage Sorghum Seed

- Forage sorghum and sorghum/sudan—seed supplies tight to already sold out on popular hybrids
  - Call your dealer tomorrow today
- Grain sorghum, supply is expected to meet the need, but some hybrids will sell out
  - $1.20-1.40/lb.; Concep seed treatment for use with Dual herbicide add ~$10-15/bag
**Sorghum & BioEnergy**

- Recent energy bill mandates 36 billion gallons of renewable fuel/year by 2022
  - Corn ethanol capped at 15 billion gallons/year
  - Sorghum is “Other,” due to less water required to initiate grain production

- Will it last?—a public concern:
  - Futures price on corn is strong
  - Should we pump Ogallala water to grow fuel?
Sorghum & BioEnergy

- Hockley Co. Ethanol—decision to use exclusively grain sorghum
  - Would require 10 counties at 25,000 planted acres each at ~3,500 lbs./acre
  - Split evenly between irrigated and dryland, harvest 80% of dryland

- Also White Energy, Plainview
  - 10% sorghum in with corn
  - 72,000 acres @ 5,000 lbs./A
Gaines Co. Sorghum Comments

- “Never really done all that well here”
- Not dryland country
- “1 lb. of seed per acre for every 1,000 lbs. of yield per acre
- Very sandy ground with lower water holding capacity
What Do You Want to Accomplish With Sorghum?

- Do we need to aim a little higher for what we expect sorghum to produce?
- Do you have grain sorghum production experience?
- Or have you grown sorghum only occasionally?
- For any past sorghum producer, what do you think you could have done better?
What Do You Want to Accomplish With Sorghum?

- Good sorghum management doesn’t mean you have to spend more $ to grow the crop.
- Hybrid yield trials often demonstrate yields that too many growers believe are not obtainable for dryland sorghum--Why?
- Producers look at A&M yield trial results, especially dryland, and exclaim “No Way!
  - A&M--Lubbock dryland, 2007: 3,868 lbs./A
  - Lubbock County average, 2007: ~2,200 lbs./A
Rainfall makes a lot of difference!

Keys to agronomics:
- ~32,000 seeds/A—many local producers are higher than this
- 40 lbs. N per acre—many local producers may not fertilize
- June 13 seeding
- Propazine weed control
Insects—Quick Note

- Greenbugs
  - Common biotype is now Biotype I (also some K)—some companies now have resistant hybrids
- Sorghum headworm (corn earworm, cotton bollworm)
- Sorghum midge—“Safe” if flower by August 1
  - Never an issue in 1999-2006
  - Later-planted fields hurt in 2007
What Do You Want to Accomplish With Sorghum?

- Difference between primary crop approach and catch crop or stepchild cropping?
- Hybrid selection?
- Seeding rate for drought potential; plant population?
- A little nitrogen fertilizer?
“We need to stop trying to farm our sorghum like we farm our cotton.”
— D.P., Dawson Co.

“I’m not sure that getting away from using the buster planter for all my sorghum was the right thing to do.”
— D.C., Lubbock Co.
**Typical Sorghum Hybrids: Approx. Days to Half-Bloom**

Ratings may vary by a few days among companies.

Knowing maturity range & days to 1/2 bloom are key to effective sorghum management strategies.

<table>
<thead>
<tr>
<th>Maturity (Leaves)</th>
<th>Days to ½ Bloom</th>
</tr>
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<tbody>
<tr>
<td>Early (15)</td>
<td>≤58</td>
</tr>
<tr>
<td>Medium-early</td>
<td>59-63</td>
</tr>
<tr>
<td>Medium (17)</td>
<td>64-68</td>
</tr>
<tr>
<td>Medium-long</td>
<td>69-73</td>
</tr>
<tr>
<td>Long (19)</td>
<td>≥74</td>
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</table>
Development of Sorghum

Medium Maturity Grain Sorghum, 17 leaves

<table>
<thead>
<tr>
<th>Stage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergence</td>
<td>6 days</td>
</tr>
<tr>
<td>Panicle Init.</td>
<td>32–35 days</td>
</tr>
<tr>
<td>Flowering</td>
<td>32–35 days</td>
</tr>
<tr>
<td>Phys. Mat.</td>
<td>32–35 days</td>
</tr>
<tr>
<td>Total Leaf Area</td>
<td>60% Total Dry Wt.</td>
</tr>
<tr>
<td>Potential Seed Number</td>
<td>Set Between PI &amp; Flag Leaf Emergence</td>
</tr>
</tbody>
</table>

Key Period

GS I: Emergence
GS II: Panicle Init.
GS III: Flowering

Total Leaf Area
60% Total Dry Wt.
Potential Seed Number Set Between PI & Flag Leaf Emergence
Components of Sorghum Yield

- Irrigated and dryland—Contributions to Yield:
  - Seeds per head: 63%
  - Heads per acre: 30%
  - Test weight: 7%

- Seeds/head makes a proportionally higher contribution in dryland
Management During Early Growth

- Panicle (growing point) differentiation corresponds to 7-8 leaf growth stage (~12-15” tall), and growing point is now above soil surface

- Herbicide labels and growth stage
  - **2,4-D, dicamba** (e.g., Banvel, Clarity, etc.), etc. should not be applied without using drop nozzles after about 5-leaf stage (~8-10” tall; some labels say up to 15”)

- Nitrogen sidedressing should be on by panicle differentiation
Sorghum Growth/Development

- Not affected by photoperiod
- Driven by heat unit accumulation
- Base temperatures: 50 F with maximum at 100 F

- $\text{HU} = (\text{Maximum} + \text{Minimum})/2 - 50$
- Flowering shows little effect of heat up to $\sim 100$ F
Sorghum--Early Planting

• This approach has some merit, particularly when certain conditions are met.

• Sorghum midge has not been a significant problem in the South Plains for some time; early planting minimizes midge (sorghum safe if flowered by Aug. 1).
Sorghum—Early Planting

- Especially for the Lubbock area on south--
  - Check local average last frost date (e.g., Snyder, 4/4; Lamesa, 4/7; Lubbock, 4/10; Plains, 4/15; also Muleshoe, 4/20; Dimmitt, 4/17)

- Allow two weeks after frost date for planting IF soil temperatures are up
Sorghum—Early Planting

* Sorghum: ideally 10-day avg. minimum soil temp @ 4” is 65 F (62 is lower limit)
* More practical consideration: 5-day average temp. at 2” depth reaches 60 F
  - http://txhighplainset.tamu.edu
  - http://www.mesonet.ttu.edu
* Early planting is not worth sickly seedlings
* What’s the forecast?
* Red grain sorghums have better cold germ tolerance (according to several seed industry sources)?
Sorghum--Early Planting

- For dryland, practicality is highly dependent on available soil water
- Good soil profile water (>3”, esp. ≥ 5”, depending on location, plant April 20-May 1, 60+ F soil temp., moisture to carry crop during flowering
- Medium-early hybrid to flower within 60-62 days, before heat of July 5-August 15
- If dry, delay planting until at hopefully at least 3-4” of moisture is present
Early planting can increase the chances of multiple mid- and Late season tillers from upper nodes. Dilemma is to spray to Dry down plants and harvest vs. wait out secondary tillers.
For Late Sorghum Plantings

- For catch crop or delayed planting--
- Check with your county Extension office or [http://lubbock.tamu.edu](http://lubbock.tamu.edu) for “Last Recommended Planting Date for Grain Sorghum Hybrids in the Texas South Plains”
Sorghum--Late Planting

- June 15 or later (June 25 or later in LRP)
- Medium maturity, flower in ~65-67 days, Aug. 20 or later (Sept. or later, LRP)
- Average killing frost
  - Muleshoe, 10/20; Dimmitt, 10/25; Plains, 10/31; Lubbock, 11/2; Lamesa, 11/4; Snyder, 11/5
- Cool fall temps more important than killing frost date
- September rains carry crop through grain fill after peak summer heat
General Last Recommended Planting Date for Sorghum

- Safe dates--protect not just against fall frost, but general cool weather of late Sept. into Oct., which curtails grain fill
  - Parmer, **Castro**, Bailey, northern Lamb, Cochran: *medium*, June 25; *early*, July 5
  - Swisher, Briscoe, southern Lamb to Floyd, Hockley to Crosby, Yoakum, Terry: *medium*, June 30; *early*, July 10
  - Lynn, Garza, Gaines to Scurry, Andrews to Mitchell: *medium*, July 5; *early*, July 15
Full Irrigation Planting

- Fit your production system

- Less concerned about flowering without any water available
Sorghum Hybrid Selection Criteria
Rule of Thumb for Selection

- Plant the latest-maturing hybrid available within the limitations of projected moisture availability, remaining average length of growing season, and crop sequence.
Choosing Sorghums for Yield

- Understand how comparing yield data among different maturity group (e.g. Medium-Early to Long) should be factored into hybrid choice
  - A1) e.g., long maturity yield potential is higher, but long maturity is inappropriate for dryland production
- Stability--Select a hybrid with stable performance record over 4-5 years.
What About Tillering?
Good and Bad

- Low tillering hybrids depend more on establishing a good stand--then it helps you manage risk, especially on dryland, as you retain control of head number.

- Caveat: a targeted low plant population tillers more, especially when cool early.
Hybrid Selection

- Be willing to spend $0.50-1.00 more per acre for a proven hybrid
- That’s easier to do at the appropriate seeding rate—easier when planting ~2 lbs./A rather than 3 lbs./A in dryland
- Sorghum seed typically 14,000-16,000 seeds per pound, but range can be ~12,000-18,000
- Germination (%): usually low to high 90s
Hybrid “Picks” Criteria

- Criteria--independent testing, with hybrids consistently in top 25% across years and locations
- Texas A&M grain sorghum hybrid results
  - [http://varietytesting.tamu.edu](http://varietytesting.tamu.edu)

- Several other companies have good hybrids that could make the “Picks” list, but they are not entered in the independent A&M trials
Dryland Hybrid Picks (A&M)


- Picks are now in flux as new hybrids are available (older hybrids now off the market)
  - NC+ Y363, 371; DeKalb 44 (40Y, 41Y); Pioneer 8505; Sorghum Partners (Novartis) KS 585, Golden Acres (Cargill) 737

- New data being generated for dryland
Dryland Hybrid Picks (A&M)

  - NC+ Y363, 371 (watching 7C22, 6B50, 5B89)
  - Monsanto: DeKalb 40Y, 44
  - Sorghum Partners (Novartis) KS 585
  - Golden Acres 737
  - Richardson 9200Y
  - Pioneer (watching 85G01, 85Y34, 85G46, 85G85 as replacements for 8505, which is no longer available)
Reduced Seed Rate--Dryland

What is the goal: “The goal is to make a crop, not a mistake” (e.g., too high seeding rate)
South Plains--Dryland

- Adjust to soil moisture condition
- **Seed drop** of 30,000-35,000 seeds/A to give 21,000 to 28,000 plants/A (~2 lbs./A)
  - Good results under a wide range of conditions
- High enough to not limit yield
- Low enough to significantly reduce potential to burn up during drought
- Adjust seed drop up only if you expect soil conditions will reduce stand establishment
Dryland Seeding Rate

- Low plant populations can retain good yield potential—a sorghum hybrid is capable of producing 1/10 lb. grain per head

- Using 1/10 lb. grain per head...
  - 3,000 lb. yield potential
  - Need ~30,000 heads per acre
  - 30,000 heads / 1.5 heads per plant = 20,000
  - 20,000 plants / 0.67 emergence = 30,000
For early July plantings with low available moisture, lower targeted plant population to about 18,000-20,000 seeds/A and plant medium-early to early, drought tolerant hybrid.

This would be about the lowest seeding rate you’d use under any circumstance.
Dryland Sorghum Seed Rate, AGCARES, Lamesa, 2002

- Fair planting moisture June 28th, overall subsoil moisture fair, but dry in top 1’
- 0.5 acre replicated plots: 26,000 vs. 51,500 seeds/A (1.6 lbs./A vs. 3.2 lbs./A)
- Yield results: a typical dryland example--
  - Low seeding rate, 1,806 lbs./A
  - High seeding rate, 1,540 lbs./A
  - Net difference, ~$21/A ($8.00/cwt)
Population Effect on Dryland Sorghum Yield—TX Panhandle

Yield, lb/Acre

Optimum Population 16,000 – 32,000

Plant Population (1000/Acre)
## Plant Population Effect on Sorghum—TX Panhandle

<table>
<thead>
<tr>
<th></th>
<th>1986</th>
<th>1987</th>
<th>1988</th>
</tr>
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<tbody>
<tr>
<td>Seed/Ac</td>
<td>32,000</td>
<td>64,000</td>
<td>32000</td>
</tr>
<tr>
<td>Plants/Ac</td>
<td>20,000</td>
<td>32,000</td>
<td>21000</td>
</tr>
<tr>
<td>Tillers/Plt</td>
<td>1.5</td>
<td>1.1</td>
<td>1.4</td>
</tr>
<tr>
<td>Heads@ Harvest</td>
<td>30,000</td>
<td>38,000</td>
<td>30000</td>
</tr>
<tr>
<td>Lbs. Grain/Hd</td>
<td>0.166</td>
<td>0.13</td>
<td>0.10</td>
</tr>
<tr>
<td>Yield, lb/A</td>
<td>5,000</td>
<td>4,600</td>
<td>3,100</td>
</tr>
</tbody>
</table>

DK 46 – Low tillering

Jones J. Prod. Ag. 91
Irrigated Hybrid Picks (A&M)

- Dumas, Plainview, Perryton, Lubbock, 1997-2007
- Monsanto: DKS54--00; Asgrow A571, A570
- Crosbyton Seed 1489 (contact for dealers)
- Pioneer 84G62
- Frontier 700
- DynaGro 780C
- Watch list (more data): NC+ 8R18 & 7R83, Pioneer 85Y40
- Other hybrids that haven’t been tested
What is Different About Picks?

❖ For irrigated vs. dryland conditions...

❖ How many hybrids were on both lists!
What is Different About Picks?

- For irrigated vs. dryland conditions...

- How many hybrids were on both lists!

NONE!
South Plains--Irrigated

- Again, consider soil moisture

- For limited irrigation (6-8”):
  - Good soil moisture, target 50-55K seeds/A
  - Poor soil moisture, target 40-45K seeds/A

- Full irrigation (12-16”):
  - ***Up to 80,000-90,000 seeds/A
  - Late-season, up to 100-110K seeds/A for non-tillering hybrids or ~90K seeds/A for tillering hybrids
Calculating Seeds per Foot

- **40” rows**—there is 13,068 feet of row in 1 acre
  - E.g., 35,000 seeds/A ÷ 13,068 = 2.7 seeds/ft.

- **30” rows**—17,424 feet of row in 1 acre
  - E.g., 35,000 seeds/A ÷ 17,424 = 2.0 seeds/ft.

43,560 square feet per acre ÷ width of row (in feet) = feet of row per acre
Trostle: “Never Seen a Sorghum Field That Was Too Thin”

- Thought I might finally have seen one in Bailey Co. in 2007
- 28,000 seeds/A under a pivot with irrigation goal of 6-8”
- Producer says “I’ve learned that is what works best for me.”
- 2007 Results: 6,000+ lbs./A
  - Gets ~4,500 lbs./A in more normal year
See handout—the example below:
- Soil moisture = 3"
- Median rainfall for 3 months (conservative) = 6"
- Targeted irrigation level = 8"
- Total water = 2 + 6 + 8 = 17"

Seeding rate
\[ \text{Seeding rate} = 32,000 + (\text{Total Water} - 12") \times 2,000 \]

E.g. \[ 32,000 + (17" - 12") \times 2,000 = 42,000 \text{ seeds/A} \]
See handout—the example below:
- Soil moisture = 3"
- Median rainfall for 3 months (conservative) = 6"
- Targeted irrigation level = 0"
- Total water = 3 + 6 + 0 = 9"

Seeding rate
\[ = 32,000 + (\text{Total Water} - 12") \times 2,000 \]

E.g. \[ 32,000 + (9" - 12") \times 2,000 = 26,000 \text{ seeds/A} \]

In 2007, soil moisture at 5-6", hence \~32,000 seeds/A
Dryland Seed Rate Summary

- Seeding to obtain a modest plant population is **agronomically** and **economically** less risky than seeding a higher plant population under droughty conditions.
Seeding on Narrow Rows?

- **Dryland**—Seed placement/stand establishment is most important
  - Consider only if you have an inter-plant planter (can drop additional boxes) or a very good no-till drill (plug 1 of 2 or even 2 of 3 rows in order to keep seeding rate down)
  - Increase seeding rate only to the degree you anticipate reduced stand establishment

- **Irrigated**—A reasonable choice, but do not increase seeding rate
  - Tillering will increase heads/acre
Rotation Benefit to Cotton?

- Texas A&M research in South Plains has measured a range in individual years of -5% to +21%
- Average is in 5-10% range
- Why negative in an individual year?
  - Lots of trash on surface hitting soil and possibly tying up nitrogen to cotton
Stubble Management

- Deep breaking stubble under will probably **not** increase soil Organic Matter
  - Instead root OM is disturbed
- Leave the stubble stand as long as possible
  - Don’t mow stubble off
  - “Why are you doing that (leaving stubble standing)? Farmers don’t do it that way.”
- Use as next year’s windbreak, especially where grain sorghum yields > 3,000 lbs./A
Cotton Herbicides to Avoid

- Staple—NEVER sorghum in hailout/replant! (only realistic option is STS-treated soybean)
- High risk to sorghum the next year, too—don’t plant sorghum after Staple

- Even banded applications still present a major concern
Other Herbicides to Watch For
(In rotation to Grain Sorghum—Incomplete List)

- Cadre, 18 months (used in peanuts)
- Pursuit {imazathapyr}, 18 months (used in Clearfield corn, peanuts, soybean)
Other Herbicides to Watch For
(In rotation to Grain Sorghum—Incomplete List)

Herbicides in wheat and other small grains, with months rotation restriction to grain sorghum:

- Amber 75 DF \{triasulfuron\}, 14 months
- Ally XP \{metsulfuron methyl\}, 10 months
- Beyond (same as Raptor) \{imazamox\}, 9 mos.
- Stinger \{clopyralid\}, 10.5
- Finesse (Glean + Ally) \{chlorsulfuron + metsulfuron methyl\}, 14-26
Other Herbicides to Watch For
(In rotation to Grain Sorghum—Incomplete List)

Herbicides in wheat and other small grains, with months rotation restriction to grain sorghum:
- Glean \{chlorsulfuron\}, 14-25
- Maverick Pro \{sulfosulfuron\}, 22
- Olympus \{propoxycarbazone-sodium\}, 12
- Olympus Flex, 9
- Rave 59 WDG \{triasulfuron + dicamba\}, 14
No rotation to cotton in 2008: **Prosulfuron (Peak)**

Atrazine--Be careful especially on sandy soils and/or <1% O.M. (that’s most of West Texas!)

- Rates ≤ 1 lb./A should be OK
- For sandy loam (or loamy sand) reduce rates to ~0.75 lb./A (~0.6 lb./A)

Watch for atrazine in metalochlor/alachlor mixed herbicides like Bicep II (Lite) Magnum, Cinch II (Lite), Bullet, Lariat
More on Atrazine

- From Wayne Keeling, TAES-Lubbock herbicide research
- For sandy soils, early POST may be slightly better than PRE, esp. if weeds are small
Propazine (Milo-Pro) for 2008

- Labeled for Texas in 2007 (Section 3)
- Label info. at http://www.albaughinc.com
- Key info: preplant, extra help on pigweed, but in general for troublesome broadleaf weeds
- Rotation flexibility for cotton or wheat
  - Tank mix with metolachlor, alachlor, dimethanamid
Propazine (Milo-Pro) for 2008

- **Rotation restriction:** 12 months to cotton & corn **IF** at full 1.2 qt/A rate
  - 120 days to wheat
- **Labeled for sandy loam soils (atrazine is not)**
  - Propazine not labeled for loamy sand, sands
- No organic matter restrictions (atrazine technically not labeled for soils <1% O.M.)
- **Use at least 30 psi, change screens to 50 mesh, agitate, Agitate, AGITATE!**
Propazine Experience
Wayne Keeling, TAES Agronomy/Weed Control, Lubbock

- 0.75-1.0 lbs./A (the quart rate) can be rotated to cotton
- 1.2 lbs./A probably no problem on heavier soils & irrigated sorghum
- Expect minimal grass activity at these rates
- Old A&M work (Wiese)—good barnyardgrass control @ 3.0
- Mixing with Dual a good idea, especially for irrigated sorghum, heavy pigweed pressure, and a wet year
- 0.75-1.2 lbs./A rates insufficient to control pigweed season-long under challenging conditions, and the addition of Dual could help
- Dryland—propazine alone probably OK. June sorghum—propazine out in late April-early May would help clean beds, reduce tillage
  - ![Label suggests applying no more than 28 days before planting](image)
Propazine Problems in 2008

- Label says change 100 mesh screens to 50 mesh
- Use higher pressure (30-40 psi)
- Keep well agitated; don’t let sit overnight in spray tank

- All material reformulated for 2008
Sorghum Herbicides

Two common herbicide problems in sorghum I hear about and see?
- Causes a couple of phone calls a year--and I’m not the herbicide guy!
- Maybe the most common problem--though we don’t often hear about it

Hint: It is not a weed problem.
First: 2,4-D Injury!

- Be really careful with
  - 2,4-D or any herbicide mixes containing these (Saber, Savage, Barrage, Shotgun, butyrac, etc.)
  - Dicamba in mixes as well

- Many farmers each year injure their crop! Yields are sometimes hurt even though plant did not appear injured.

- Sprayer equipment, applicators--even labels!--aren’t perfect
2nd--Hooded Sprayer Errors

Using hooded sprayers in grain sorghum for:

- paraquat dichloride (Cyclone Max, Boa, Gramoxone Extra/Max)
- The family of glyphosate chemicals (Roundup, etc.)
- 2,4-D
- Dicamba
Anticipated 2008 Problem

• How many calls will I get on this topic?

• Roundup drift from cotton on to grain sorghum

• A reminder to the neighbors—there is going to be more sorghum around in 2007
Sorghum--Common Mistakes

- Too high seeding rates, esp. on dryland, with no drought-tolerant hybrid

- Not planting for stand establishment, plant anchoring

- Failure to control economic infestations of greenbug or late-season head insects
Sorghum--Common Mistakes

- Dryland flowering early-July to mid-August
  - incremental advantage to grain yield by reducing risk of flowering during peak average summer heat
  - A nice rain on June 5 poses the decision of whether to wait

- N fertility (lack of), ~2 lbs. N/100 lbs. of yield goal—source is soil and fertilizer N
  - For reference, P₂O₅ is low priority, ~0.375 lbs./100)
Sorghum & Water Relations

- Rain (and irrigation): Catch it! Keep it! Reap it!
- It takes 6-8” of available water to get a crop of typical sorghum plants to the point of grain production (Dan Krieg, Texas Tech)
  - ~5” for low plant population dryland sorghum
- Once met, additional moisture has large effect on yield, 350-425 lbs./A per 1”
Figure 1. Water needs for sorghum rise sharply at the rapid growth stage, peak during the boot stage and then drop off afterward.
Full Irrigation

- Maximum yields at 3.5 to 4.5 gpm/A
  - Corn comparison would be ~5.0-6.0 gpm/A
- LEPA or low-set nozzles increase water efficiency
- Critical irrigations at mid-vegetative stage, boot, heading, flowering, grain fill
Development of Sorghum
Medium Maturity Grain Sorghum, 17 leaves

Emergence | Panicle Init. | Flowering | Phys. Mat.
6 | 32 – 35 | 32 – 35 | 32 – 35 | 6

GS I | GS II | GS III

Key Period

Total Leaf Area
60% Total Dry Wt.
Potential Seed Number Set
Limited Irrigation Sorghum

- Highest return usually occurs if sorghum is irrigated at **boot stage** (provided you can get to that point)
- Avoid moisture stress during the mid-vegetative stage (30-35 days after planting, i.e., growing point differentiation)
Similar to grain sorghum, growing point differentiation in wheat leads to small head down in stem—spikelet number and seeds per spikelet pretty much already determined. If grazing and then going to grain then cattle should have been off about 7-10 days prior.
9,600 lbs./A, Hale Co.

- 24” of water (irrig./rain) for grain yield
  - Add in 7” to get the crop to the point of grain yield (31” total)
- A more realistic goal: 6,000 lbs./A with medium or medium-long maturity
- 15” of water for grain yield
  - Add in 6” to reach point of grain yield (21”)
  - 3” soil water, 6” rain, 12” irrigation
Irrigation Termination & Harvest

- Termination of irrigation: near soft dough, if good soil moisture is still present
- Physiological maturity is at black layer (~10-12 days after soft dough)
- Seed moisture at black layer is ~25-35%
- Harvest below 20% moisture with drying required
- Market price based on 14% grain moisture to avoid dockage (may depend on delivery point)
Sorghum Dry-Down Issues

- Problem of delayed harvest due to slow drydown of vegetation OR sucker head development
- Glyphosate sprayed at physiological maturity kills the plant
  - Could impair standability if harvest is delayed as plants are dead
- Gramoxone, sodium chlorate
  - More burn down action, plants may grow through desiccated vegetation
Sorghum Irrig. on Split Pivot

- Farmer consideration—splitting pivot with different crops requiring water at different times to reduce total irrigated acres at one time

- Which crop has main emphasis?
  - Cotton production, give it all you can?
  - Sorghum—you signed a pounds contract?—you have to spread your crop loss/low yield risk to ensure delivery of pounds of grain
Sorghum Irrig. on Split Pivot

- **Two-crop/two planting date/split pivot scenarios**
  - Early cotton, late June sorghum
  - Early sorghum, delayed cotton
  - Early sorghum, late sorghum same pivot

- The goal is to increase the time you are mostly watering just half the acres
Shifts in Projected Dates

- A specific planting date for either cotton or grain sorghum does not mean cut-out or flowering will occur on a certain day or within a few days.

- Heat unit accumulation drives physiological growth—it is potentially driven faster by heat.
Shifts in Projected Dates

- Early cool fall temps. can greatly slow growth
- It is not worth sickly or slow emergence on cotton or sorghum if it means you need to wait 5 days to early plant
  - The potential damage in a start in cold conditions is a greater risk than if irrigation or heat during flowering hit crop later
  - If temperatures are reasonable is there a major cold front in the next 5-7 days?
Scurry/Howard/Dawson/Lynn/Terry
Early Cotton, Late GS

- Half pivot with cotton, planted ~May 5
  - Peak water use early July to mid-August
  - Physiological cut out (5 NAWF) by ~August 10
  - Greatly reduce irrigation ~Aug. 20 if soil moisture is available, A&M data suggests little additional irrigation benefit esp. if some rain is received

- Consider medium maturity sorghum, ~5,000 lbs./A yield goal,
  - “Schedule” flowering about September 5
  - Back up 65-67 days (from 9/5)—plant ~July 1
Result: cotton is up to 3 weeks past cutout prior to sorghum flowering (~Sept. 5), and lower moisture requirement.

Sorghum enters peak water demand ~7 days after cotton cut out when cotton irrigation is greatly reduced.

- Sorghum maturity near October 10 with added potential of Sept. rainfall assisting yield.

Concentrate water to cotton early with 1-2 possible key waterings to sorghum prior to flowering (panicle differentiation, early boot).
Scurry/Howard/Dawson/Lynn/Terry

Early GS, Delayed Cotton

- Half pivot with medium-early sorghum, planted ~April 25
  - Medium-early hybrid, flower by June 25—peak water use is declining as cotton water needs rise rapidly
  - Maturity about August 1st & harvest begins Mid/late-Aug.
- Cotton planting delayed to May 15th
  - Physiological cut out ~Aug. 20th
  - Little overlap in peak irrigation needs
  - How strong is your water?
## Split Pivot Sorghum—2 Plantings
**Dawson/Lynn/Terry Co., Medium Maturity**

<table>
<thead>
<tr>
<th>Timing</th>
<th>Planting Date</th>
<th>Flowering</th>
<th>Maturity</th>
<th>Maximum Water Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early</td>
<td>April 25</td>
<td>July 1</td>
<td>Aug. 5</td>
<td>6/15 to 7/10</td>
</tr>
<tr>
<td>Late</td>
<td>June 30</td>
<td>Sept. 5</td>
<td>~Oct. 10</td>
<td>8/20 to 9/15</td>
</tr>
</tbody>
</table>
Hockley/Lubbock/Crosby/Floyd/Hale Early Cotton, Late GS

- Half pivot with cotton, planted ~May 5
  - Peak water use early July to mid-late August
  - Physiological cut out (5 NAWF) around Aug. 15?
  - Reduce irrigation ~Aug. 25 if moisture is available, A&M data suggests little additional irrigation benefit esp. if some rain is received

- Consider medium-early maturity sorghum, ~5,000 lbs./A yield goal,
  - “Schedule” flowering about September 1
  - Back up 60-62 days (from 9/1)—plant ~7/1
Result: cotton is up to 2 weeks past cutout and higher moisture requirement prior to sorghum flowering (~Sept. 1)

Sorghum enters peak water demand about time of cotton cut out but before end of cotton irrigation

- Sorghum maturity near October 5-7 with added potential of Sept. rainfall assisting yield

Concentrate water to cotton early with 1-2 possible key waterings to sorghum prior to flowering (panicle differentiation, early boot)
Hockley/Lubbock/Crosby/Floyd/Hale

Early GS, Delayed Cotton

- Half pivot with medium-early sorghum, planted ~April 25 (watch soil temps. if cool)
  - Medium-early hybrid, flower by June 30—peak water use is declining as cotton water needs rise rapidly
  - Maturity about August 5th & harvest begins ~Aug. 20

- Cotton planting delayed to May 15
  - Physiological cut out ~Aug. 25-30th
  - Little overlap in peak irrigation needs
  - How strong is your water?
## Split Pivot Sorghum—2 Plantings
Hockley/LBB/Crosby/Floyd/Hale, **Medium** Maturity

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<td>July 5</td>
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<td>6/20 to 7/15</td>
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<td>Late</td>
<td>June 25</td>
<td>Sept. 1</td>
<td>~Oct. 5</td>
<td>8/15 to 9/10</td>
</tr>
</tbody>
</table>
This is harder to separate irrigation of the two crops than to the south and east

Half pivot cotton, planted ~May 10
- Plant cotton earlier if you safely can due to soil temp.
- Peak water use early July to late August
- Cut out (5 NAWF) about August 20-25th?

Consider medium-early maturity sorghum, ~5,000 lbs./A yield goal (~9” irrigation?)
- “Schedule” flowering about Sept. 1st
- Back up 60-62 days (from 9/1)—plant about June 30th
Result: cotton is about 1 week past cutout before sorghum flowering (~Sept. 1)

Cotton cutout about 0-7 days after peak sorghum water demand begins
- Sorghum maturity near October 5 (this is close to early frosts) with potential of Sept. rainfall assisting yield

Concentrate water to cotton early with 2 possible key waterings to sorghum prior to flowering (panicle differentiation, boot)
Early G.S. vs. May 10 Cotton

More separation in water use

Half pivot with sorghum, planted ~May 1
  - Medium-early hybrid, flower by July 1
  - Peak sorghum water demand conclude by July 8

Can’t really advocate delaying cotton

Half pivot cotton, planted ~May 10
  - Peak water use early July to late August
  - Cut out (5 NAWF) about August 20-25th?
## Split Pivot Sorghum—2 Plantings

Parmer/Castro/Bailey/N. Lamb/Cochran, **Medium-Early** Maturity

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<th>Maturity</th>
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</tr>
</tbody>
</table>
Splitting/Spreading Water Use

- Half pivot with **runner peanuts** and grain sorghum
  - You can not diminish water to peanuts!
  - Peak peanut water use early July to early/mid September
  - This scenario doesn’t offer the rotational crop benefits that are probably most important to cotton
  - Recommended crop rotation is minimum 1 year peanut in 3
  - One year in 4 is even better for peanut
  - Preferable to let each sorghum and peanut rotate with cotton but not each other

- Consider medium-early maturity sorghum, 5,000 lbs./A yield goal, and planting late April
  - Flowering and peak water use by June 30th
  - Some sorghum water sharing with peanut needed
Sorghum/Peanut  (Gaines, Terry Cos.)

- Result: sorghum is at or past flowering (~June 30) before peanut enters peak water demand
- Concentrate water to peanut after July 1 with only 1 possible additional watering to sorghum, esp. if soil water is banked
  - Sorghum maturity by August 5
Possible Early Peanut

~May 1 Valencia peanut maturing in 127-130 days to digging

Must dig to avoid loss of large pods

Most remaining irrigation can go to sorghum by about Sept. 1