



2016 Alternative Crop Options after Failed Cotton and Late-Season Crop Planting for the Texas South Plains

14th Annual Edition

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The primary objectives of this guide include providing producers with:

- 1) Guidelines for crop replant options after failed crops, especially cotton;
- 2) Assist with late-season planting decisions where timely planting, duration to crop maturity, and fall weather risk may impact successful cropping;
- 3) Provide contractor contact information as well as recent approximate pricing particularly for crops where price is fixed at contract signing.

New information/What has changed since 2014 & 2015?

Some of the information this year due heavy April (2015) and May rains (2015, 2016) that are greatly delaying planting. Additional points include:

- Added comments on cotton variety selection, growth and regrowth after hail damage, and targeting late-season uniformity across the field (p. 3).
- Updated on-line chemical label look-up information for <http://www.cdms.net> (p. 4).
- An update on sugarcane aphid in Texas and its possible implication for grain sorghum in the South Plains (thresholds for spraying were lowered mid-season in 2015, and lowered further for 2016; also the SCA did overwinter in scattered locations in the South Plains) as well as links to grain sorghum hybrids that express tolerant of the aphid (p. 8).
- Reference to updated weed control guides for grain sorghum (p. 12) and sunflower (p. 13).
- Reporting of recent research that suggests hybrid pearl millet is (only) a poor-host of sugarcane aphid and is thus a possible alternative forage option to sorghum family forages (more likely down state), p. 23.
- Weighing the possibility of replanting to dryland corn, p. 27.

Crop hailout decision tools and late-season crop guidelines are outlined as follows for topics and crops in the Texas South Plains region:

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I. Evaluating Crop Damage and Remaining Stands for Cotton as well as Corn, Grain Sorghum, and Sunflower

Hailout, wind, and blowing sand damage on West Texas cotton are frequently heavy in May and June, up to 400,000 acres in some years (~10% of the total crop). Additional dryland cotton may not emerge in time (late June) to produce a viable crop that will mature very well. Marginal cotton stands or marginal cotton seedling health may be evaluated for possible termination. In typical years through early to mid-June early maturing cotton varieties might be replanted as soon as possible, especially south of Lubbock (full and reduced coverage insurance cut-off dates are later), or growers may consider taking insurance disaster payments and leave it at that. Producers that choose to replant back to cotton must manage the new crop for earliness due to the abbreviated growing season. First position fruit set is critical for short season cotton and should be protected from insect damage and stress that can cause shed. Other producers will consider replanting to catch crops if alternative crop options, herbicide rotation restrictions, etc. are favorable.

As we may encounter further significant hail and wind damage on cotton in the coming weeks, growers with damaged cotton stands will await crop insurance adjuster decisions. Furthermore, there was a major delay in cotton planting in many counties in 2016 due to rains, stagnant soil temperatures, and even delayed ag. financing decisions. “Prevent planting” crop insurance may enter the picture for many growers in the May 31 full-coverage planting area (Bailey, Lamb, Hale, Floyd Cos. and north). Although your crop insurance may have considerable influence on your decision regarding damaged cotton, here are suggestions to keep in mind.

Don’t Terminate Questionable Cotton Stands Too Quickly

Moving past early to mid-June, however, will cause some growers to go ahead and replant to other crops rather than wait any longer for insurance decisions. As is the case with any crop, sometimes replant decisions are made on insufficient information and emotion, and tearing up a stand that in fact still has respectable yield potential is a mistake to avoid. Previous work performed in Texas has shown that producers may find it appropriate to retain surviving cotton stands with as little as 1.5 healthy plants per foot of row, particularly if the remaining stand is uniformly spaced (see references below). The performance of cotton at low populations will be determined primarily by the environmental growing conditions present through the remainder of the season and the growth stage at the time the hail or other source of crop failure occurred. Variety maturity characteristics may also play a role, in combination with season length, due to differences in boll distribution as related to cut out.

There is adequate time to replant to other crops, so that shouldn't factor in terminating a questionable cotton stand. Numerous replant options are readily available through early July. As usual, cotton herbicides, goals of the producer, available equipment for other crops, and production economics will dictate which crop may be more suitable to a particular situation. As planting dates move toward late June, however, maturity class (shorter) will increasingly become a consideration for some replant crops such as grain sorghum.

Evaluating Stand Loss and Replant Decisions

Cotton

Both variety selection and crop management practices may need to be adjusted if replanting a failed stand back into cotton. If a small percentage of survivors from the first planting are present, a herbicide application should be considered to eliminate existing plants that will compete with the second planting. This will help reduce interference from the previous crop, eliminate weeds that had escaped earlier herbicide applications, and provide uniformity across the field in regard to population and growth stage. Moving forward, an earlier maturing variety that begins reproductive growth at lower mainstem nodes will aid in making the most out of the shorter season. A more aggressive plant growth regulator strategy may also aid in controlling excessive growth and enhancing earliness, however, this should take into account the environmental parameters that are the primary drivers of crop growth.

The primary cotton assessment publication from Texas A&M AgriLife Research & Extension, Lubbock, is useful for evaluating cotton stand loss and replant decisions. Contact your county agricultural extension agent (CEA) or the Texas A&M AgriLife Research & Extension Center's Lubbock website for the following information:

- Effects of Stand Loss and Skips on Cotton Yields, James Supak and Randy Boman, Texas A&M AgriLife Extension Service, Lubbock, (1997), <http://lubbock.tamu.edu/files/2011/10/standloss.pdf>
- Making Replant Decisions in Cotton, Randy Boman & Robert Lemon, Texas A&M AgriLife Extension Service, Lubbock (2007), SCS-2007-08, <http://lubbock.tamu.edu/files/2011/10/makingreplantdecisions07.pdf>

Corn, Grain Sorghum, and Sunflower

For many growers, particularly from the Lubbock area and northwest, if cotton has been hailed out then other crops may be heavily damaged as well. The following resources are also available from AgriLife Extension:

- Assessing Hail and Freeze Damage to Field Corn and Sorghum, John Bremer, Cloyce Coffman, and Steve Livingston; Texas A&M AgriLife Extension Service, publication B-6014 (1995—the

information is still quite valid), http://publications.tamu.edu/CORN_SORGHUM/PUB_Assessing_Hail_and_Freeze_Damage_to_Corn_and_Sorghum.pdf

- Evaluating Hail Injury and Stand Reduction in Texas Sunflower, Calvin Trostle, Texas A&M AgriLife Extension Service, Lubbock (2001)
<http://lubbock.tamu.edu/programs/crops/sunflowers/hail-injury-stand-reduction>.

For information on evaluating weather damage to other crops, contact Dr. Calvin Trostle.

Replanting and Compliance with Government Programs

Some undesirable quirks in Farm Service Agency (FSA) rules preclude planting of some vegetable and fruit crops on program crop ground. In making decisions to replant cotton to alternative crops producers should check how planting other crops may affect their compliance with government programs. These programs may dictate which alternative crops can be planted without losing base or benefits. Contact the FSA office serving your county for specific information regarding your farm. Unfortunately, crop programs may render agronomically sound cropping practices untenable if it will hurt your base acreage, particularly for cotton.

Prevent Planting Crop Insurance claims: If you collect on prevent planting (e.g., cotton in 2015) then this likely strictly limits you to replanting cover crops only in 2015, which can only be hayed or grazed after November 1. Furthermore, if you do plant a cash crop after prevent planting you may limit your prevent-planting payment to 35% or less—or none at all. Consult your crop insurance agent and/or FSA to ensure you understand these provisions.

II. Replanting after Cotton and Late-Plant Considerations for Subsequent Alternative Crops

Foremost among replanting considerations on cotton ground are potential problems with residual cotton herbicides. Your cotton herbicide may dictate crop selection for replanting. **This has been especially true with Staple** in some years (more details below), which is often used for morningglory control. Consult product labels for rotational crop restrictions for the herbicide you used on cotton. Keep in mind that most of the lower Texas South Plains is predominantly sandy ground hence herbicide activities can be higher on susceptible alternative crops. Of course buster planting may be used to “break out” the treated soil in order to get below the herbicide zone for some herbicides, particularly the ‘yellows,’ but this wouldn’t necessarily address problems with a herbicide that is more soluble, or more mobile, like Staple. It is recommended that producers avoid “pulling” the treated soil toward developing plants during cultivation until later in the season in order to reduce potential for herbicide effects on developing plants.

Online Access to Herbicide and Other Chemical Labels

Whether on your home computer, your tablet, or with your smart phone in the field, there is a convenient way to access chemical labels for everything from a quick check to assistance in planning your herbicide program. Chemical Data Management Systems, <http://www.cdms.net>, offers quick access to labels and Material Safety Data Sheets for herbicides, fungicides, insecticides, seed treatments, and many other labeled agricultural products.

AgriLife Extension has compiled a user guide for how to best utilize this valuable on-line resource. **“Ready On-Line Access to Chemical Labels for Agricultural Production,”** is available to view, print, or download from <http://lubbock.tamu.edu/files/2015/04/Ready-On-line-Access-Chemical-Labels-CDMS-April2015.pdf>

It is relatively simple to access labels online, and CDMS makes it even easier by compiling them all in one place. This URL enables you to conduct several additional tasks (register for free), including: 1) Search by active ingredient. This will enable you to find alternative chemicals or possibly more cost effective generics; 2) Learn what other chemical options may be available for your crop. For example, you can search by ‘chemical type,’ (e.g., insecticide, herbicide, etc.) and your target crop (grain sorghum, sunflower, etc.); 3) Minor crops provide a challenge as there may be few labeled herbicide or other chemical options. Rather than read a dozen or more labels, find which ones to read first by searching by crop and chemical type.

Cotton Herbicide Considerations

Among crop options after cotton, soybeans, sunflower, guar, cowpeas, and peanuts are typically grown with yellow herbicides, and thus do not experience potential injury risks like grain sorghum. Herbicide carryover injury from cotton fields may be a particular concern for Caparol, Cotoran, Karmex, Diuron, and Staple in soil residues. These herbicides, especially Staple, are potentially more likely to injure grasses like sorghum and corn than the yellows, often on sandy soils where residues could be spread throughout the soil though substantial rains and/or irrigation since application could dilute their potential effect. The problem of herbicide residues in soil can often be minimized if not avoided in heavier textured soils with a buster planter to establish a herbicide-free seed zone. Again, consult the chemical labels or your chemical dealer.

Cotton producers are making greater use of Dual/Dual Magnum (*s*-metolachlor) or Warrant (acetochlor) herbicide, and if replanting to grain sorghum then safened sorghum seed (Concep III, many others) can be planted directly into the treated soil with little risk of sorghum injury. Growers need to consider the potential cost per acre of this treatment (and agronomically sound seeding rates may minimize the cost) and the advantages that Dual or Warrant may offer. Planting sorghum on Staple ground is simply not recommended buster planter notwithstanding. The Staple label even excludes sorghum planting the year after Staple application, and injury is known to have occurred. Staple is moderately mobile in the soil according to Dr. Wayne Keeling, Texas A&M AgriLife Research weed scientist, Lubbock.

The label on Staple notes that sulfonylurea tolerant soybean (STS) can be planted 30 days after the Staple application. Supply of group IV STS soybeans in the South Plains is more common than years past when seed needed to be ordered (see more info in the soybean section below). Dr. Brent Bean, formerly Texas A&M AgriLife Extension Service, Amarillo, has previously tested STS soybean tolerance to several commonly used sulfonylurea herbicides (different chemical family than Staple, but cross tolerance is good) at rates up to 4X. Only one of several herbicides gave any noticeable injury in two years. When wheat prices are strong, wheat is another option for Staple-treated ground as the rotation restriction is only 4 months.

Texas A&M AgriLife Research & Extension High Plains staff that can assist with producer questions on herbicides include:

- Dr. Peter Dotray, Lubbock, (806) 746- 6101, pdotray@ag.tamu.edu (specializing in cotton and peanut herbicides; also crop rotations involving guar, sunflower, sesame, grain sorghum)
- Dr. Wayne Keeling, Lubbock, (806) 746- 6101, wkeeling@ag.tamu.edu (rotation to most crops)
- Dr. Russ Wallace, Lubbock, (806) 746- 6101, rwwallace@ag.tamu.edu (specializing in herbicides for peas, vegetables, cucurbits, berries, etc. and effects of herbicides applied in other crops on subsequent pea, vegetable, and cucurbit production)

Be Realistic about Replant Cropping Expectations

Realistic crop replant goals must consider numerous factors, including:

- A practical alternative crop choice after failed cotton will typically have a low establishment cost with the flexibility to adjust inputs only if conditions continue to improve.
- A suitable alternative crop fully utilizes previous inputs and maximizes growing conditions anticipated for your growing area.

Here's an example where the above principles are challenged, for better or worse: Since 2003, when producers in the Lamb Co. area tried shorter-season Spanish peanuts planted mid-June and even up to about the 25th, there has been a willingness on the part of producers to consider peanuts and even corn as replant options. "Is this what you really had in mind, a high-input catch crop?" I ask. A few of those 2003 growers thought they had figured out a smart way to make some money, but many if not most of these fields were a disappointment in spite of a relatively late fall. See the further discussion at the end of this document about the pros and cons of peanuts or corn.

Many replant crops grow well for producers, but then the crop may sit there until cotton harvest is nearly complete. To that end producers should ask themselves if a particular crop is appropriate if it will be subject to yield and quality losses in the fall due to greatly delayed harvest.

Also, several of the crops listed below, due to possible later planting dates, may reach maturity and optimum harvest conditions at the same time that cotton desiccation/defoliation and cotton harvesting occur. Producers are going to focus on those tasks thus harvest quality, harvest losses, etc. may be negatively affected in alternative crops as they await harvest after farmers complete cotton harvest. Several crops such as sorghum and sunflower can often be managed for harvest well before cotton harvest to spread the workload and reduce losses in these crops compared to maturing during cotton harvest.

Economics of Alternative Late-Season Crops

Texas A&M AgriLife Extension Service economists at Lubbock have compiled irrigated and dryland crop enterprise budgets for several crops that may be useful in assessing and comparing economics of different crops of management practices. Economic information is compiled online at <http://southplainsprofit.tamu.edu> where you can find several aids to crop insurance, federal crop program details, as well as the 'Comparative Profitability Spreadsheet,' which contains about thirteen irrigated and nine dryland crop budget sheets for crops you might be planting either after cotton or else late in the season. The Microsoft Excel spreadsheet can be downloaded to your computer, you enter your crop's input cost information, and then you can compare different crops based on the numbers you insert.

For further information on the website and the spreadsheet, contact Lubbock AgriLife Extension agricultural economists Dr. Jackie Smith, jgsmith@ag.tamu.edu, (806) 746- 6101.

Replant/Late-Season Cropping Options, Crop Maturity, and General Last Recommended Planting Dates

Among the following crops, planting date suggestions (Table 1) reflect what Extension believes is a conservative but appropriate buffer against cool fall conditions and early killing frost dates relative to historically average fall weather. Some of these recommendations, especially for grain sorghum, were strongly tested by the combination of August and September cool spells in 2008 topped off by the October 23 freeze. And in 2012 much of the Texas South Plains had a freeze that extended south of Lubbock on October 8-9. Many prior recent fall seasons beginning in 1997 have been considerably later than average. **We should guard against complacency about the risk of late planted crops not approaching their yield potential (poor seed filling potential) due to the cool weather preceding heavy frost or a light freeze.** That potential cool weather, when heat unit accumulation basically ceases for most crops, is usually a greater concern than the actual killing frost date.

A Special Note about Recommended Last Planting Dates

Suggestions for last recommended planting dates and/or crop maturity are provided for numerous crops. *These dates focus on crop maturity though likely at the expense of yield because of late planting, even if crop maturity is achieved.* Depending on the crop these suggestions have been developed from:

- Thirty-year climate data
- County elevation
- Hybrid or variety maturity
- On-farm observations
- Previous suggestions

Table 1. Summary of general last recommended planting dates for alternative or late-planted crops, Texas South Plains, based on county.

Northwest: Parmer, Castro, Bailey, northern Lamb, Cochran
 Central: Swisher, Briscoe, southern Lamb, Hale, Floyd, Hockley, Lubbock, Crosby, Yoakum, Terry
 Lower: Lynn, Garza, Gaines, Dawson, Borden, Scurry, Andrews, Martin, Howard, Mitchell

Crop	<u>Suggested Last Recommended Planting Date for South Plains Region</u>		
	Northwest	Central	Lower
Grain sorghum†	6/25-7/5	6/30-7/10	7/5-15
Sunflower	7/5-12	7/10-17	7/15-22
Guar	6/25	6/30	7/5
Sesame	6/15	6/20	6/25
Black-eyed pea, pinto, green bean	7/5	7/10	7/15
<u>Summer Annual Forages</u>			
Sorghum/sudan, sudangrass, hybrid pearl millet (hay, grazing)	7/20	7/25	7/30
Forage sorghum (silage)	7/1	7/5	7/10
Soybean	6/30	7/5	7/10
<u>Peanuts</u>			
Spanish (140-145 day maturity)	5/20	5/25	5/30
Valencia (125-130 day maturity)	5/30	6/5	6/10
<u>Corn</u>			
115-day relative maturity	6/10	6/15	X
105-day relative maturity	6/20	6/25	X
95-day relative maturity	6/30	7/5	X
Corn silage	Generally up to 14 days after grain date above for maturity		

†See the sorghum section for a breakout of last recommended planting dates based on hybrid maturity.

These suggestions strive to be practical though they are not perfect. The objective for growers is a relatively “safe” recommended last planting date with a good expectation of successful production for a

particular crop. Occasionally we have a very early fall (e.g., early frost/freezes in 2008, 2012; or even just sustained cool fall weather). Thus to plant too late means a grower may risk insufficient crop maturity (low yield or test weight, poor quality, etc.) for a crop in 2 or 3 years out of 10 as immature crops may languish during cool weather. Finally, last recommended planting dates reflect an assumption that growers understand the need to shorten crop maturity with later planting dates when appropriate.

These suggestions should encourage the farmer to not plant so late to lose significant yield potential and economic value, but to also reduce risk of late-season crop injury to a minimal level. As our experience increases with various crops these dates will be re-evaluated. When crop prices are strong, this necessitates all the more making the right call on replant and late-plant decisions to capture profit potential in the market.

Having the Right Attitude toward Replant Crops

A poor attitude toward the commitment to grow another crop right is often the downfall of many of the crops discussed below, especially in a replant situation. Some of these crops like grain sorghum and sorghum hay forages, guar, sesame, don't require a lot of inputs in a replant situation, but yet management—not necessarily requiring significant input expenses—can make or break these crops as a catch crop. I believe we should expect more from our catch crop sorghum. Resist the temptation to plant the cheapest seed you can find. Learn what the key things are that you need to do to make these crops work for you in 2016 if you are put in a replant or late plant situation.

III. Management Guidelines for Replant and Late-Planted Crops

Grain Sorghum

Numerous grain sorghum production resources for the 2016 cropping season are available for viewing/downloading from <http://lubbock.tamu.edu/sorghum>

United Sorghum Checkoff Program Pocket Production Guides—USCP-funded preparation of pocket guides for grain sorghum including three editions that cover portions of Texas (“West Texas” covers the South Plains, Rolling Plains & Concho Valley; “High Plains” covers the Texas Panhandle; and “South & Central Texas”). View these guides online or download at <http://www.sorghumcheckoff.com/farmer-resources/grain-production/> (or read at <http://sorghum.mobi> from your smartphone). To obtain a print copy, call USCP (806) 687-8727.

Current South Plains 2016 new crop contract prices on grain sorghum are generally \$0.10-0.15/bushel below Dec16 corn which translates to ~\$7.50/cwt. for grain sorghum. Contracting may be of interest to irrigated growers. A sample of contract sorghum prices can be obtained by calling local and regional grain buyers. Consider delivery locations and trucking costs in your net price. The standard moisture for grain sorghum is 14.0%, so you will be docked above that percent. Be sure to also inquire about the maximum moisture a delivery point will accept.

Grain Sorghum and Sugarcane Aphid in the Texas South Plains

Sugarcane aphid (SCA) arrived late in the 2014 season in the Texas South Plains. It was present at minimal levels in some fields in 2014, and at higher numbers in a few, but did not affect yield. For the Texas High Plains in 2015, SCA caused severe problems in untreated grain sorghum and also in treated grain sorghum (it appears initial thresholds were too high, sprayed for other reasons, etc.). This was a stark and perhaps unexpected contrast to downstate grain sorghum in 2015, of which little was sprayed and major damage was scattered.

Control guidelines for SCA in the Texas High Plains are different—thresholds are lower, and you can access these guidelines at <http://www.texasinsects.org/sorghum.html>. The statewide sugarcane aphid management guide (2016) describes the insect, provides details on identification and scouting, but for specific High Plains spray guidelines access “[2016 High Plains Sugarcane Aphid Management Guide and Scouting Card](#).” The threshold for seedling to pre-boot grain sorghum is 20% of the plants in the field have the **Presence** of SCA (not tied to a number of aphids per leaf or per plant like downstate). AgriLife Extension entomologists also recommend insecticide treated seed (e.g., Poncho, Gaucho, CruiserMaxx, etc.) for grain sorghum. This may add ~\$50/bag to seed costs, but it is spread over 12-25 acres, and offers some protection for at least 30 days on vulnerable seedling stage grain sorghum.

Unlike the previous winter in 2015-2016 SCA did overwinter in the South Plains in test cages near Roscoe, O’Donnell, and Plainview. You can track SCA movement in Texas and obtain updated management advice at <http://txscan.blogspot.com/>. Overall, though SCA may again become a major issue in the South Plains in 2016—no one knows at this time—it is a manageable insect if treated on time. Recommended insecticides (Transform, Sivanto) are easy on beneficials, which are a major component of control. To locate an AgriLife Extension entomologist in your area or receive their newsletter, consult <http://www.texasinsects.org/contact-main-page.html> for a specialist or IPM agent.

What about purported tolerant or resistant hybrids? Know first that ALL grain sorghum hybrids are susceptible to sugarcane aphid at some level, must be scouted, and sprayed if thresholds are met. To date only a minimal amount of information is available from university testing in Texas and elsewhere. Although United Sorghum Checkoff Program compiled a list of hybrids based on limited data and the information companies provided which the companies believed represent their best potential genetics for helping slow the SCA pest, (see <http://www.sorghumcheckoff.com/newsroom/2016/03/28/sugarcane-aphid/>), Texas A&M AgriLife is expanding regional trials in 2016 to document field response of grain sorghum hybrids to SCA. {If you access the above URL **do not** use those SCA control guidelines, which are better suited for other regions rather use the AgriLife Texas High Plains guidelines noted above}. For questions to ask your preferred seed dealer about choosing a grain sorghum hybrid in the face of potential sugarcane aphid issues, consult AgriLife’s “Caveat” suggestions at <http://lubbock.tamu.edu/programs/crops/sorghum/>

Other Sorghum Information

Producers frequently ask if they can contract/sell their grain sorghum directly to any of the four regional ethanol plants (Levelland, Plainview, 2 in Hereford), all which have used at least some grain sorghum (Diamond Ethanol, Levelland was all sorghum at one time). Although these ethanol plants have occasionally bought direct (or more likely accept direct delivery if not buying direct; Diamond Ethanol may offer a bonus for direct delivery even if contracted through an intermediary), farmers should anticipate that each plant works with area grain elevators and brokers to supply sorghum and corn. Producers may call the ethanol plants to learn if each plant has partnering elevator/buyers booking grain for future delivery. Producers may ask if there are any early delivery pricing incentives (most likely August delivery of new crop). Due to the grain sorghum export market to China from the Texas Gulf Coast, sorghum use for ethanol has decreased due to the better export market.

Texas A&M AgriLife Extension Service, Lubbock last compiled “Recommended Last Planting Date for Grain Sorghum Hybrids in the Texas South Plains” in 2007. Many current hybrids are still listed in the guide and producers may note the last recommended planting date for similar maturity hybrids for a particular company. View/download at http://lubbock.tamu.edu/files/2011/10/lastrecsorgplantingdatetx07_71.pdf

Grain sorghum hybrid selection for irrigation and dryland may use Texas A&M AgriLife Research Crop Testing Program field trials in the Texas High Plains. See <http://varietytesting.tamu.edu/grainsorghum/>

Two key recent High Plains multi-year summaries are posted there. These include irrigated tests, 2009-2014 (Lubbock, Hereford, Perryton); and dryland tests, 2012-2014 (Lubbock, Bushland, Lamesa, Levelland, Clovis).

Grain Sorghum Hybrid Maturity & Last Recommended Planting Date—Texas South Plains

The table below is a general and conservative guideline for last recommended plantings of grain sorghum hybrids on the South Plains.

As planting moisture is available, mid- to late June is a preferred time to plant dryland sorghum, particularly medium and medium-early maturity hybrids as grain filling will occur in September after the worst of the summer heat is over and September rains assist the crop. Medium and medium-early sorghum hybrids are less likely to overextend available and expected moisture; hence these hybrids are more likely to make grain in dry years. Furthermore, medium and medium-early hybrids still retain good yield potential whereas yield potential often declines significantly with true early maturity sorghum hybrids. Recent tests, using company hybrid maturities, found that ‘early’ grain sorghum hybrids yielded 18% less than hybrids labeled as ‘medium-early.’ Medium-long maturity hybrids are not recommended for any dryland planting in the South Plains region.

How do these last recommended planting dates fare in an early freeze?
October 23, 2008/October 8, 2012

For the most part producers who hit the last recommended planting date in 2008 with a particular maturity hybrid in their county received fair results, with some test weights less than 56 lbs./bu. However, many producers planted hybrid maturities in 2008 that were well past their last recommended planting dates (in some cases they couldn’t get seed of shorter maturities), and this led increasingly to immaturity, reduced yields, and low test weights. Heat unit calculations demonstrated that cooler than normal periods of August 15-20 and September 8-19 then the October 23 freeze (long-term average Oct. 31-Nov. 2 at Lubbock) slowed maturity. If a farmer planted just 5 days later than the last recommended planting date, however, for any hybrid and county, then reduced heat unit accumulation would have had a much greater negative impact on maturity than the weather with an additional 12 days later maturity hence delaying the total crop maturity by about 2 weeks. ***The bottom line? Planting date really matters!*** Likewise, in 2012 producers who followed planting date X hybrid maturity guidelines for the early Oct. 8 freeze were able to edge by without significant damage, but later plantings experienced significant yield loss.

Table 2. General last recommended planting dates for grain sorghum maturity groups, TX South Plains.

Counties	----- Grain Sorghum Maturity Class -----				
	<u>Long</u>	<u>Medium-Long</u>	<u>Medium</u>	<u>Medium-Early</u>	<u>Early</u>
Parmer, Castro, Bailey, northern Lamb, Cochran	June 10	June 18	June 25	June 30	July 5
Swisher, Briscoe, southern Lamb, Hale, Floyd, Hockley, Lubbock, Crosby, Yoakum, Terry	June 15	June 23	June 30	July 5	July 10
Lynn, Garza, Gaines, Dawson, Borden, Scurry, Andrews, Martin, Howard, Mitchell	June 20	June 28	July 5	July 10	July 15

Typical grain sorghum hybrids: Days to half-bloom and days to maturity. Days to half-bloom is when half of the sorghum heads in a field are in some stage of bloom (sorghum heads flower starting at the top and proceeding down the head). Some companies will rate half bloom a few days differently for the same maturity group. Knowing the range of maturity and days to half-bloom are key to effective sorghum management strategies and a producer's ability to *schedule* flowering. Once half-bloom is reached sorghum hybrids will complete flowering in a few days then proceed to grain filling and physiological maturity when black layer occurs in the seed (Table 3). This typically takes 32-35 days, but cool weather can greatly retard grain fill and lead to low test weight.

Table 3. Approximate days to half bloom and days to physiological maturity for grain sorghum hybrid maturities, Texas South Plains.

Grain Sorghum Maturity	Days to ½ Bloom	Approximate Days to Physiological Maturity*
Early	≤58	<90
Medium-early	59-63	90-96
Medium	64-68	97-103
Medium-long	69-73	104-110
Long	≥74	111+

*Uses ~32-35 days for grain fill to maturity (flowering to black layer) for all hybrids. This is different (and shorter) than harvest maturity.

Basic Seeding Rates for Grain Sorghum—A Common Grain Sorghum Production Mistake

Many producers err on the side of planting **too much** grain sorghum seed per acre. As a result, in droughty conditions producers are at risk of inadequate moisture *per plant* during flowering and grain fill to produce grain. This problem was quite evident in 1999, 2000, and 2003 in the South Plains. When soil moisture levels are very good (5-6" total stored soil moisture) a good target is 30,000-35,000 seeds/A. Sorghum seed ranges from 12,000 to 18,000 seeds/lb., with most around 14,000 to 16,000 seeds/lb., thus this seeding rate is near 2.0 lbs./A for many sorghum hybrids. If soil moisture is fair (~2-3"), seed drop might be reduced to ~24,000-28,000/A. For any condition with poor soil moisture, especially as plantings approach July 1, consider even just 20,000 seeds/A. These seeding rates will seem unbelievably low to some prospective growers, but data has suggested over many years that these numbers are realistic. And if moisture conditions improve substantially after planting, sorghum's strong ability to compensate for low plant population will still make respectable yields. These seeding rate suggestions are a risk management tool. Yes, in some years a higher seeding rate might in fact offer some additional return, but the difference is minimal compared to the downside potential of having too many plants for too little available moisture thus not making much crop, particularly for dryland.

For assistance with grain sorghum seeding rates see the basic grain sorghum seeding rate guidelines for West Texas noted in the above sorghum production guide produced in conjunction with United Sorghum Checkoff program.

For limited irrigation sorghum (projected 6-8" irrigation, typical of many producers in the South Plains) with very good profile moisture conditions, target 50,000-55,000 seeds/A, but if soil moisture is minimal, reduce seeding rates by up to 10,000 seeds/A resulting in a total seed drop of 40,000-45,000 seeds/A. For

full irrigation levels (12-16”), target 68,000-80,000 seeds/A. Extension suggests you cap your seeding rates at 80,000 seeds/A in just about any high irrigation scenario (and in grower surveys in 2015 some high-yield producers find that 50-000-60,000 seeds/A is all they need to make 10,000+ lbs./A grain sorghum), though by late June/early July consider up to 90,000-100,000 seeds/A for non-tillering hybrids as an attempt to synchronize bloom and reduce late maturing heads from tillers.

For replant grain sorghum, increase seeding rates slightly if trouble is expected with cotton herbicides or poor seeding conditions.

Because seed costs are still relatively low for sorghum (~\$2.50 per pound) for safened seed + basic fungicide, growers too easily use higher seeding rates as it doesn't much affect production costs. Many companies now routinely treat all seed with Concep III/safener, which allows use of Dual, Warrant, and similar herbicides (*s*-metolachlor, acetochlor, alachlor, dimethenamid). This adds \$15-20 per bag for all seed, but simplifies marketing and warehousing. Insecticide treatments such as Poncho, Gaucho, or Cruiser—offering insect protection potentially up to 45 days—may add \$40-60/bag.

Is reduced-price “Replant Special” grain sorghum seed a good deal?

Maybe not! We haven't seen this in general for several years, but from time to time companies offer substantial discounts on sorghum seed for replanting failed cotton (or if you planted a certain cotton with a technology fee), but the net cost difference at the above seeding rates (~2 lbs./A for dryland) is minimal. If it causes you to pick an inferior hybrid, then it is NOT a good deal. Don't expect the good hybrids to go on sale (but some of them were available at greatly reduced prices if you had planted specific cotton brands). Pick your hybrid first and ignore the discount seed—or earnestly any seed cost in grain sorghum! Once you are ready to decide among two or three hybrids only then consider lower cost. If the hybrid you chose costs a little more to plant per acre, shrug it off and plant the hybrid you selected.

Other Grain Sorghum Considerations

Limited but timely irrigation in grain sorghum. Many producers replanting to sorghum on what was irrigated cotton may consider limited irrigation. Although producers may convert failed irrigated cotton to dryland sorghum production, keep in mind that even one or two timely irrigations at boot stage just prior to heading and flowering can substantially lift yield. Other timely irrigations may occur 1) just prior to growing point differentiation when the sorghum plant begins a 7 to 10-day process of setting your maximum potential number of spikelets per head and seeds per spikelet (this begins about 30 to 35 days after germination depending on hybrid maturity and weather), and 2) during grain fill after flowering, especially if dry.

Sorghum fertility. This is often by-passed in an effort to minimize costs. Sorghum requires about 2 lbs. N per 100 lbs. of grain, sourced from fertilizer N applications, existing soil profile N to 24” deep, and even irrigation water. When dryland deep soil moisture conditions are present and an adequate planting rain occurs I then expect good potential return for side dressing limited N (either coultured or knifed in or applied in irrigation water, but not broadcast on dryland fields), particularly if applied by growing point differentiation. Many producers for irrigated cotton who put down preplant N will probably add little if any additional N for sorghum unless their sorghum yield goal is above 5,000 lbs./A. P₂O₅ applications on soils that test ‘moderate’ (20-50 ppm) show inconsistent yield responses for most crops, however, if P₂O₅ tests ‘low’ (10-20 ppm) then phosphorus requirements may approach 1/3 to 2/5 of the N requirement (not just the applied N).

Herbicides and grain sorghum: Drs. Calvin Trostle and Extension agronomist Dr. Joshua McGinty, Corpus Christi, have summarized available herbicides and their use in grain sorghum. The 2016 information is posted at <http://lubbock.tamu.edu/programs/crops/sorghum/>

Huskie herbicide. This product became available late in 2011. It has excellent control on pigweed species, and does not have the injury potential of 2,4-D or dicamba (grain sorghum grows out of

leaf burn due to Huskie). The label all but invites producers to use with atrazine for improved weed control as well as include NIS. For agronomic instructions with Huskie, review the herbicide summary at <http://lubbock.tamu.edu/files/2011/10/Huskie-Grain-Sorghum-Summ-Jan2015-Trostle.pdf> and consult the label. This herbicide may play a major role in dealing with glyphosate-resistant Palmer amaranth. Since 2014 the label expands the application window past 12" tall to 30" tall though atrazine is not used after 12" tall sorghum. Some cotton injury was observed in 2014 from 2013 use, however, which we largely attribute the near complete lack of moisture Sept. 2013 to May 2014 (<2", little microbial breakdown).

Atrazine/propazine in sorghum then rotating to 2016 cotton. We are frequently asked about atrazine in sorghum. Technically, the atrazine label bars use on sandy loam and loamy sand soils, or for soils with <1% organic matter. A specific recurring question about sorghum is "What rate can I use and go back to cotton next year?" The atrazine label would say that no application after June 10 should be made if you expect to return to cotton the next year. We believe, otherwise, that rates near 0.75 lb./A will still offer significant weed control in sorghum and will not likely harm cotton the following year. On the sandiest of soils where potential residual herbicide activity will be higher, a producer might consider 0.6 or even 0.5 lb./A rate. We believe this is in the range where producers might not be satisfied with control, but if soils are extremely sandy, then activity on weeds should still be significant.

In contrast propazine is labeled for sandy loam soils, makes no restriction due to soil organic matter, has a 12-month rotation restriction for cotton only at the full rate (1.2 quarts/A) for finer soils, and preplant applications should not be incorporated on sandy loam soils. Cost will be higher for propazine, but there is general agreement that the potential injury to rotational cotton is less likely with propazine than atrazine.

Tips from producers using propazine since 2007 include increasing the pressure and even taking the recommended 50-mesh screens out to ensure flowability. Do not leave any propazine in the tanks overnight and expect to agitate it enough. Albaugh, Inc. reformulated Milo-Pro after 2007, and few if any flowability problems have been reported since 2008. But the label still suggests 50-mesh or higher coarse screens and maintaining pressure of at least 30-40 psi.

A Final Note about Sorghum, Replant or Otherwise

Expect more from your crop and do the little things that will help stand establishment, anchoring those brace roots (throw some dirt around the base of the plant), etc. In the words of one Dawson Co. farmer, "let's stop farming sorghum the way we farm cotton." What D.P. means in part is that sorghum used to be planted by many producers with a buster planter (in the bottom), and the opportunity is there to readily move soil around the base of the plant to help the plant stand better as well as cover small weeds.

Sunflower—Confectionary and Oilseed

For 2016 sunflower production information for the Texas High Plains, including a new weed control guide (2015-2016), view the AgriLife page at <http://lubbock.tamu.edu/programs/crops/sunflowers/>

Contractors and Pricing (updated week of June 6, call for latest information)

Sunflower contracts in 2016 continue the practice of contracting acres not pounds. Some contracts may have different language for disaster clauses, which may affect price by \$1/cwt.

Texas High Plains sunflower hybrid testing data for confectionary and oilseed, reporting multi-year averages when possible, are collected at the above URL as well as <http://varietytesting.tamu.edu/sunflower> Newer high oleic oilseed hybrids have been tested in West Texas since 2005, and yields and oil contents are similar to NuSun.

For a review of sunflower growth stages, <http://www.sunflowernsa.com/growers/growth-stages/>

Confectionary Sunflower

Contracting in 2016 was available early in the year at prices similar to last year. To our knowledge no

confectionary contracts remain available. Split pricing is for seed size above and below those seeds that are retained above or pass through a screen of 20/64". Some contracts now include a choice of a Clearfield or Clearfield Plus confectionary hybrid (see notes below under Oilseed Sunflower).

- Red River Commodities. Lubbock, TX, (800) 763-9740, Larry Martin, larrym@redriv.com Since 2015 yields were good and carryover is higher than normal, early 2016 price was mostly available only to previous growers with Red River (common price was \$27/17 per cwt., based on seed size). Currently no further contracts are available, though this sometimes changes at the end of June. Normally, allow at least 4-5% for trash. Delivery points usually include Lubbock, Barwise (near Petersburg), Allmon (Floyd Co.), and Hale Center, and other possible locations further north. Hybrid choices include Clearfield/Clearfield Plus.
- Erker Grain. Ft. Morgan, CO, (800) 809-4463, Mike Erker, merker@erkergrain.com Confectionary in the Texas High Plains at ~\$27/17 per cwt. are full with delivery to Sanderson Grain, Springlake, TX, (806) 986-4236. Using mostly NuSeed 5009 hybrid.
- Bailey Grain Company, Ft. Worth, TX, office (817) 731-6341, Bill Bailey mobile, (817) 296-1887, bill@baileygrain.com Limited confectionary acres in the Texas High Plains are currently full for 2016. Using NuSeed 5009 hybrid.
- Frontier Ag. Goodland, KS, (785) 899-5607, Mike Bretz, mbretz@frontieraginc.com Limited if any contracting for 2016 due to carryover stocks. In the past Frontier on-farm bids differed from delivery if a producer has his own storage. Call for local delivery options otherwise anticipate Goodland, KS or other western Kansas locations. Allow at least 4-5% for trash. Using Nuseed 5009 hybrid.
- SunOpta. Grace City, ND, (701) 674-3179. Kent Johnson, kent.johnson@sunopta.com Possible buying in some years in Texas, including contracting of "Conoil" hybrids (not this year).

Oilseed Sunflower

Oilseed sunflower has several options including oil market as well as birdfood. Crushing oilseed in the Texas High Plains is now exclusively high oleic, but you can use what you want for birdfood:

- Mid-oleic (NuSun) vs. high oleic oilseed (traditional oilseed is no longer grown unless for birdfood, but TX seed dealers don't stock traditional oil sunflower seed). High oleic oilseed may offer a premium up to \$2/cwt. in the oil market or may be the only option. There are plenty of good hybrid choices available, and there is no yield drag with HO relative to NuSun.
- Clearfield/Clearfield Plus imi herbicide-tolerant hybrids (several companies)—this added weed control option using Beyond herbicide is becoming more popular, and may include over 50% of Texas sunflower oilseed acres. Clearfield Plus allows hotter spray tank additives (crop oil or MSO) rather than NIS, and now beginning in 2015 higher rates of Beyond herbicide. Use nitrogen for both. Do not use crop oil or MSO with Beyond herbicide on sunflower hybrids labeled Clearfield only—Clearfield sunflowers cannot handle Clearfield Plus treatment. Beyond timing remains the same even for Clearfield Plus hybrids (conclude by 8-leaf stage, which is about 3 weeks after planting).
- Sulfonylurea herbicide-tolerant oilseed hybrids (ExpressSun from Pioneer; also Croplan and Nuseed Global (formerly Seeds2000). Producers who have used Express herbicide have liked the weed control in part because there is an application window up to 2-3 weeks longer than for the Beyond herbicide in the Clearfield system (up to just prior to the "R-1" or initial bud stage).
- Short-statured hybrids (Mycogen). These sunflowers tend to be 1 to 2' shorter than conventional height hybrids, depending on the hybrid. Yields are comparable to conventional height sunflowers and oil content has been higher than average. The relative height difference was greater before 2010 and some so-called short-stature hybrids might now be better called 'reduced height.' If marketed as short stature then a farmer expects to be able to make at least some of the sunflower head moth sprays with a ground rig, and the shorter stature will also permit weed cultivation further into the season.

Oil content effect on net pricing. All oilseed prices have a standard base of 40.0% oil with a 2-for-1 premium for oil content above 40.0%, a 2-for-1 discount for oil at 38-40%, and a 2.5- or 3.0-for-1 discount for oil below 38%. For example, if a grower delivers at \$20/cwt. with 41.0% oil, then he is paid at \$0.40/cwt. premium, or \$20.40/cwt. But if oil content is 39%, then pay price is \$19.60/cwt (some buyers discount at 2.5%). For other examples, use National Sunflower Association’s online calculator at <http://www.sunflowernsa.com/growers/marketing/oil-premium-calculator/> A&M AgriLife Research & Extension trials in the High Plains since 2005 have averaged 40-43% oil, but late-planted sunflower may sometimes drop below 38% if maturity is cut short.

- Eastern Colorado Seeds. Burlington, CO/Dumas, TX/Clovis, NM. ECS contracted primarily in the past for California Oils, but now serves several end-users. Kelly Jack, M (806) 241-8644, kelly.jack@ecseeds.com. Contracting high oleic in West Texas at ~\$16.00/cwt. with delivery near Ropesville (CPE Feeds); Olton (Texas Best Bean, (806) 285-3144), and Dumas (Oglesby). Prefers high oleic hybrid Mycogen 8H449CLDM.
- ADM/Northern Sun. Goodland, KS, (800) 542-7333, sam.lauderdale@adm.com. Taking delivery from West Texas at the Northern Sun crushing plant. Delivery direct to Goodland for high oleic is currently ~\$19.40/cwt. and NuSun (mid-oleic) at \$17.65/cwt. Prices that include an ‘act of god’ clause (if you lose the crop, you are not bound to deliver) are \$1.00/cwt. less. Also, delivery might be available at reduced prices at Oklahoma ADM elevators in Hooker (580) 652-2623, and Tyrone (580) 854-6285, OK.
- Colorado Mills. Lamar, CO, (719) 336-8452, Kevin Swanson, kevin@comills.com. Deliver direct to Lamar. Currently contracting high oleic (\$19.40/cwt) using straight production contracts (delivery what you produce, no contracted amount); NuSun is \$17.65/cwt.
- Adams Vegetable Oils. The Woodlands, Calif. John Gilbert, (530) 304.3254, jgilbert@adamsgrp.com Delivery to Brownfield Seed & Delinting, Brownfield, TX. High oleic only. Early June 2016, \$15.50/cwt.
- Red River Commodities. Lubbock, TX, (800) 763-9740, larrym@redriv.com No oilseed contracts for birdfeed remain for 2016. Price was \$17.50/cwt. No penalty/premium for oil content. Delivery locations differ from above confectionary sites. Use any oilseed hybrid.

Oil and confectionary last recommended planting dates for the Texas South Plains include a two-tiered recommendation (Table 4). Kansas State University’s goal for sunflower is that for best potential yield, percent oil, and test weight, the crop should mature within the frost-free growing season. Sunflower is tolerant of temperatures down to 28°F, however, we accept that late planting dates may indeed experience cool fall conditions. Because sunflower has much higher tolerance to cool fall conditions and even a light freeze, these last recommended planting dates are more ambiguous for sunflower than for other crops.

- Tier 1 Late Planting Date (optimum ‘plant by’ date)—a conservative last recommended planting date highly likely for full maturity crop production in all but the worst of fall conditions;
- Tier 2 Extended Late Planting Date—Successful production can occur, but yields and oil content

Table 4. Last recommended planting dates for sunflower in the Texas South Plains.

Counties	Tier 1--Primary	Tier 2--Extended
Parmer, Castro, Bailey, northern Lamb, Cochran	July 5	July 12
Swisher, Briscoe, southern Lamb, Hale, Floyd, Hockley, Lubbock, Crosby, Yoakum, Terry	July 10	July 17
Lynn, Garza, Gaines, Dawson, Borden, Scurry, Andrews, Martin, Howard, Mitchell	July 15	July 22

may be reduced. There is potentially less flexibility in a Tier 2 planting date the further north in the Texas High Plains. Producers in some areas have planted even a week later than this with success, but there is a significantly increased risk.

For a full discussion consult ‘Last Recommended Planting Date Guidelines for Sunflower in the Texas & Oklahoma High Plains’ (2015) at <http://lubbock.tamu.edu/programs/crops/sunflowers/>

Sunflower Seeding Rate (not plant population)

For both oilseed and confectionary hybrids, seeding rates are critical to crop success, especially confectionary where high plant population leads to smaller seed, which are worth 1/3 to 1/2 less than the large seed. Like sorghum, general experience is that too high seeding rates can hurt the producer. Purchase sunflower plates/discs for your air-vacuum planter and ensure the planter is dropping the target number of seed, especially for large seeded confectionary. The following seeding rates reflect targeted plant populations at stand establishment of 85% of planted seed. Because South Plains soil water-holding capacity (lower in sandy soils) and evapotranspiration here is higher than in Kansas or Colorado, seeding rate targets are generally slightly lower than recommendations in northern states.

Suggested sunflower seeding rates (not plant population) for West Texas. The presence or lack of deep soil moisture shifts the suggested seeding rate up or down within the range.

	Irrigated	Dryland
Oilseed	20,000-23,000	14,000-18,000
Confectionary	16,000-18,000	12,000-14,000

The above recommendations are bolstered by Texas A&M AgriLife Extension research in 2001-2003 from Plainview and Dumas particularly for irrigated confectionary. Across a range of confectionary seeding rates from 11,000 to 22,000 seeds/A, yields showed little difference but confectionary seed size was substantially affected: the lower the seeding rate the higher proportion of large seed. This ranged from 70-75% large seed at the low seeding rate to ~45% at high seeding rates. This difference on a 2,000 lbs./A yield is equivalent to ~\$60/A more income with the lower seeding rate at 2016 contract prices!

Yield potential trends may decline slightly during the season with later planting dates, but sunflower head moth pressure also usually declines with later planting dates. Common concerns about sunflower production in the South Plains revolve around sunflower moth control, volunteer sunflowers the following year (use a pan header or other header built specifically for sunflower at harvest and possibly Round-Up Ready cotton the following year), and that sunflowers were “hard on the ground.” Fertility on sunflowers is not to be neglected lest subsequent residual soil fertility for the next crop be poor. In general, nitrogen fertilizer is recommended at the rate of 5 lbs. N per 100 lbs. of yield goal.

Planting the field. Uniform sunflower stands are sometimes difficult to achieve. Field surveys in most U.S. sunflower producing states suggest a common yield limiting factor is a lack of uniform stands due to irregular seed placement, and I think this is more common for confectionary sunflower with their larger woody shell (I prefer small size confectionary seed) which must imbibe more water to germinate. But the planter itself can be a problem. Consult National Sunflower Association’s “Sunflower Seed Placement & Stand Uniformity” guide at <http://www.sunflowernsa.com/uploads/3/planting-sunflower.pdf> for 12 pages of advice on improving your sunflower planting, including tips for your air-vacuum planter units.

Limited but timely irrigation in sunflower. Sunflower is very adaptable to limited but timely irrigation, particularly from bud stage at about 0.5-1.0” diameter to flowering ~20 days later and then an additional ~20 days to petal drop.

I especially recommend that new and prospective sunflower growers study production suggestions for West Texas sunflower summarized in “Common Concerns in West Texas Sunflower Production and Ways to Solve Them,” available at the above Lubbock website. Kansas State Univ. also has a good sunflower production guide with nice pictures on the web at <http://www.ksre.ksu.edu/bookstore/pubs/MF2384.pdf> Consult KSU’s crop production bookstore for other helpful reading on sunflower.

Timing of Sprays for Sunflower (Head) Moth Control

The damage inflicted by uncontrolled sunflower moth (commonly referred to by many as ‘head moth’) is a nuisance if not the downfall of some sunflower production, particularly among new growers. Understanding this issue is critical to sunflower production success. Although the biology of sunflower moth is quite different than weevils, there is a big reason I often refer to sunflower moth as “the boll weevil of sunflower.” Left uncontrolled the larvae of this insect can wreak havoc on a sunflower crop, much of the damage coming not just from the burrowing larvae but the subsequent opportunistic infection of fungal *Rhizopus* head rot.

For information on sunflower insect control check with your local Extension IPM agent and consult AgriLife Extension bulletin B-1488, “Managing Insects Pests of Texas Sunflower,” which was updated in 2009. The document is available online at <http://lubbock.tamu.edu/programs/crops/sunflowers/>, and producers may also contact the author Dr. Ed Bynum, Extension entomologist, Amarillo, (806) 677-5600, ebynum@ag.tamu.edu

Scouting sunflower moth is best done early in the morning or after sunset as the heat cools off. You may get best results using a flashlight to find the adults on the head. During the heat of the day the moths tend to hide under leaves and may not fly much so they are harder to find—you will not get a reliable indication of the need to spray unless you simply see a few moths either flying around or on the head (which means pressure is high).

Industry partners suggest—and AgriLife Extension entomologists and I concur—that sunflower growers make their initial sunflower moth spraying decision targeting the initial spray at bloom of just a few percent bloom (and never later than 20%), so as to increase chances of control. Bloom constitutes when the ray petals have opened up and you can then see the center of the head (see pictures in “Sunflower Bloom-Growth Staging for Sunflower (Head) Moth Control” at <http://lubbock.tamu.edu/programs/crops/sunflowers/>. This means making the sunflower spraying *decision* 1-3 days earlier when you start to see the back side of the yellow ray petals on the head scattered across the field. The updated threshold no longer cites a particular number of moths per five heads rather the threshold notes the presence of moths in the field. Some producers, consultants, and contractors essentially schedule sprays for sunflower moth no matter what. Scouting is still important, and experience suggests that once you spray you should scout ~2-4 days later to ensure you achieved control. If a grower ends up with head moth larvae infestation, typically it means that the farmer sprayed too late. Some of our field observations have indicated just how fast sunflowers can bloom going from 6% on day 1, 19% on day 2, 43% on day 3, 67% on day 4.

For a review of the pros and cons of different philosophies of sunflower head moth control and their timing among industry, farmers, and research review the “Texas Sunflower Insects Summary” PowerPoint at <http://lubbock.tamu.edu/programs/crops/sunflowers/>.

Labeled products for sunflower moth control include numerous pyrethroids (Warrior T, Baythroid, Asana, Mustang Max) and Lorsban (chlorpyrifos, but to not use alone). Also newer products with different modes of action that attack worms rather than adults are now available (see brief comments in the above Insects Summary). These include Prevathon (chlorotraniliprole), Belt (flubendiamide), or Besiege (chlorotraniliprole + pyrethroid), which AgriLife Extension is currently testing. At this time, we don’t

agree with company guidelines to spray pre-bloom (Prevathon). In calculating production costs, I recommend that producers go ahead and budget two sprays for irrigated and one spray for dryland. Let not having to spray be a nice treat, but don't short the necessity of spraying if the moths, even at seemingly low levels, are present. When using an airplane do not use less than 3 gallons of water per acre (even if the label says 2), and in fact increase to 4 or even 5 gallons per acre if you can. Coverage is key! What product you use for sunflower moth control is, we believe, the third most important consideration whereas timing is first, and coverage is second.

Guar

Guar production in West Texas is available on contract at Guar Resources, Brownfield (see below). Texas A&M AgriLife continues guar research and programming for this drought and heat tolerant crop as we believe there is a strong fit for this crop in much of semi-arid west Texas, and we are expecting contracting opportunities to rebound moving forward from current low prices due to the downturn in the oil and gas industry. For guar contracts contact the following:

- Guar Resources, Brownfield, TX <http://www.guarresources.com/> (806) 637-4662. Contact production director Dustin Patman, dustin.patman@guarresources.com, M (806) 548-1780, for contract terms with Brownfield delivery (also see website for an explanation). Current price is \$0.16/lb. Guar Resources is installing new splitting and powder equipment in 2016 which will be ready for the 2016 harvest.
- United Guar, Houston, TX & Altus, OK, <http://www.unitedguar.com>, (844) GUARGUM, or (844) 482-7486. In 2014 United Guar initiated building a new split plant at Altus, OK, but has mothballed plans for now with the downturn in global guar prices. Contracting will begin when guar prices return to historical levels. For regional discussion contact Dr. Lewis Norman, lewis.norman@unitedguar.com, M (580) 467-6073
- Southwest Agriculture, Houston, TX. Call for further information on future possible contracts. Dr. Phil Laughlin, phil@southwestagriculture.com, M (979) 292-9029

Guar input costs at this point are minimal and this should be considered when looking at gross and net return potential. No dryland guar in the South Plains in 1998-2015 that I know of required treatment insects or diseases. This excludes the variety Monument (a Texas Tech release in about 2009), which is a shorter maturity variety with limited planting (see below).

Guar and weed control. Guar is well suited for dryland production on ground that has few weed problems. It is tolerant of yellow herbicides (trifluralin) used in cotton production, but few other options are available for herbicides on guar; you can use glyphosate as a preplant burndown Aim (carfentrazone) is labeled for use with a hooded sprayer, and Select or other clethodim products may be applied to control grasses in guar. A label is being sought for 2,4-DB.

Varieties. Five varieties of guar are available, including the recent Texas Tech release Matador, and all may be planted up to about July 4 in the South Plains although June 20th would be more favorable. Seed sources in 2016 exist through your contractor and small quantities through Texas Foundation Seed Service, <http://tfss.tamu.edu>. Current varieties include Kinman, Lewis, Santa Cruz (old public varieties), Judd 69 (a selection from older A&M crosses?), and TTU's Matador. Producers and Texas A&M AgriLife Extension staff have reported significant field losses on one additional variety, Monument, due to stalk breakage and disease problems (possibly bacterial blight), and this variety does not hold up well if planted late and conditions turn moist (disease affects foliage, pods). I do not recommend planting Monument.

Be sure of high quality guar seed that is free of morningglories. Some guar seed in past years had low germination so be sure that year of production (preferably at least 2013) and germination are acceptable. Guar seed germ holds good for at least five years. Field observations since 1999 suggest that Lewis is

slightly earlier in maturity than Kinman and Matador. Data from the early 1980s suggest that Lewis out yields Kinman, and yield for Matador is similar to both. Dryland guar yields under average conditions are about 400-1,000 lbs./A, and somewhat higher for irrigated.

Irrigation. Guar responds well to one or two early or mid-season irrigations of 2-3", but I have seen yields reduced by over 25% due to regular sprinkler irrigation relative to dryland production on the same field. This may be due to interference with pollination. Terry Co. data in 1999 suggested 100-125 lbs. guar per 1" irrigation water under limited sprinkler irrigation. Because of the deep tap root on guar, this crop, like sunflower, favors large individual irrigations relative to frequent irrigation. The crop is extremely heat tolerant and can take advantage of deep subsoil moisture when available even though rainfall may be infrequent. Hence if the crop can be established it should perform satisfactorily if minimal additional rainfall occurs due to tapping deep soil moisture.

Row spacing and seeding rates. Guar appears suitable for narrower row spacings, especially the non-branching Lewis variety (also Monument). Consult your contractor for seed cost (possibly \$1.25-1.50/lb.). Target 5-8 lbs./A, the higher end as conditions are more favorable (irrigation) or as row spacing narrows. Guar Resources as well as the former West Texas Guar recommend that producers go ahead and use the higher seeding rate on dryland.

Guar and *Rhizobium* inoculants. Guar is a legume, but getting it to nodulate very well has been difficult. Ideally guar seed should be inoculated with guar-specific *Rhizobium* preferably one that has a sticker to adhere the inoculum to the seed for best results, although we have not had good success obtaining desired nodulation. Unfortunately, no guar-specific inoculants are available at this time (and the most recent one that was, a seedbox powder, did not perform well). Ask your contractor about inoculants. Sono Ag, Plainview, produces a non-specific crop inoculant for the seed that can be used for guar. This liquid product, Micronoc, now includes a nodulating strain of bacteria that was isolated from nodules on guar in West Texas, and several growers have reported satisfactory nodulation in some years. Keep in mind that planting into hot, dry soils is not conducive to developing nodulation regardless of the product.

Harvest. Substantial harvest losses may be minimized by using a low profile row-crop (soybean) header relative to a conventional flex bar header. Even better, custom guar harvesters (e.g., Barringtons of Oklahoma) and farmers with air reels should be able to minimize harvest losses if they go slow enough to do a good job, but expect to pay \$3-4/acre more than regular combine rates. Extension believes harvesting with air-reel headers is worth it due to higher harvested yields and less seed on the ground, which reduces volunteer guar problems the following year (this is a common concern that needs research for how to control volunteer guar with Roundup Ready cotton or other means).

Contractors can provide additional production information. Recent guar production information has been compiled at <http://lubbock.tamu.edu/programs/crops/other-field-crops/guar/>, which also provides an old 1977 Extension document "Keys to Profitable Guar Production" with good, basic information.

Sesame

Drought- and insect-resistant sesame is a crop option after failed cotton though Sesaco emphasizes primary crop production. Producers in Texas report that wild hogs do not cause major damage. Crop insurance is available for several Texas High Plains & Rolling Plains counties if applied for earlier in the season. {These counties include Gaines, Terry, Dawson, Hockley Lubbock, Crosby, Lamb, Hale, Floyd, Castro, Swisher, Tom Green, Runnels, Jones, Haskell, Wichita, Wilbarger, Hardeman). An attractive sesame market has returned for South Plains growers due to delivery points in the High Plains. Sesaco, <http://www.sesaco.com>, is currently targeting in the range of 150,000 contract acres for Texas and southwest Oklahoma for 2016. Current base contract price is \$35/cwt. for irrigated and \$32/cwt. Several additional premiums (typically \$1-3/cwt., short of an early freeze occurring) kicking in for clean samples, minimal crack seed, and seed color.

For production, contract information, and delivery locations call High Plains Sesaco representative Joe Guzman, jguzman@sesaco.com, M (806) 781-5908. Current South Plains delivery locations include Hart, a likely location south of Lubbock as well as Stamford (40 miles north of Abilene). Beyond the South Plains sesame delivery is also usually available in the Vernon/Chillicothe area. Sesaco offers two producer production guides:

- Sesame Producer Guide, http://www.sesaco.com/Websites/sesaco/images/2012_Sesame_Producer_Guide_13_Feb.pdf
- Sesame Harvest Guide, http://www.sesaco.com/Websites/sesaco/images/Harvest_pamphlet_080903_final_b.pdf

In general, Sesaco anticipates that for dryland production with good early season moisture, expect 500-900 lbs./A, and for irrigated production, 1,000-1,500 lbs./A.

Historically, the Caprock region of West Texas has grown the best quality sesame in the U.S, but old varieties were not suited (too long in season or split open dropping their seed on the ground). Newer varieties have improved shatter resistance, shorter maturity, and lower height for combining. Sesame may be planted, preferably on 30-inch rows, from late May to late June, and needs 95 days before first frost. In general, the crop can be grown with existing farm equipment. Texas A&M AgriLife Extension Service began testing sesame varieties for the first time on dryland in 2003 in Dawson County, with yields running about 550 lbs./A in spite of only 4.5” of rainfall while the crop was growing (adequate stored soil moisture contributed to yield).

Sesame, like guar, is not for your weedy ground. Six individual herbicides are registered for sesame: Roundup (preplant); clethodim (Select Max, Arrow, etc.) and sethoxydim (Poast) for in-season grass control); ethalfluralin (Sonalan HFP) and trifluralin (Treflan HFP) details are obscure, but listed in footnotes (Sesaco recommends apply at least 45 days in advance of planting) are labeled in 2016. An “indemnified” Section 24(c) label (the risk is yours) for Dual Magnum (83.7% a.i.) is available for sesame in 2016 (register then access through <http://www.farmassist.com>). Texas A&M AgriLife Research beginning in 2004 tested sesame for tolerance to applied herbicides in cotton. Yellow herbicides on cotton hail-out ground don’t appear to be a major problem. Dr. Pete Dotray, Texas A&M AgriLife/TTU weed scientist, (806) 746- 6101, has also conducted cotton herbicide injury trials on sesame.

Contact Calvin Trostle for additional AgriLife sesame information. Access a production PowerPoint for the Texas High & Rolling Plains at <http://lubbock.tamu.edu/sesame>

Black-eyed Peas and other Pea, Pinto, and Bean Crops (Primarily Contract Only)

Black-eyed pea contracts for 2016 are essentially full, but other peas or beans may be available. Price and contract availability may change weekly and where you deliver, payment terms (especially what is net to the producer after cleaning charges), etc. are important considerations. Although contractors are often “full” due to early season contracting, sometimes contract acreage may not get planted or new market requests are received, thus additional contracts may be offered. Thus it doesn’t hurt to call for current availability and prices.

Black-Eyed Peas

A special note about black-eyed peas is merited. Black-eyes, due to their popularity, can easily be overproduced if not overcontracted. Contracting too many acres is the #1 threat to a producer’s profit (e.g., 1999), and sometimes contractors may reduce prices later in the season for additional contract prices due to potential oversupply. Growing without a contract, or wildcatting, is discouraged. Some growers doing this in previous years have received as little as \$3/cwt. As an alternative crop in a hail-out

situation, growers should not necessarily expect to receive quoted prices on hailand acreage compared to early season contracts.

These contractors might have contracts available reflecting any recent changes in market demand or unplanted contract acreage returned to the contractor. Remember that quality adjustments, delivery terms, and payment dates vary among contractor. Thus some contracts may be more favorable than others apart from price, so call for details. Be sure you understand if your quoted price is before or after cleaning charges, which typically run 5-6 cents a pound. Companies/contractors active with 2016 contract acreage for black-eyed peas in the Texas South Plains are noted below. Some early season contracts were in the range of \$40/cwt. after cleaning.

Prices below reflect net price after cleaning for U.S. #1 grade:

- C.K. Nickels Co., Muleshoe, (806) 272-5589. Chad Nickels chad@cknickels.com, delivering in Muleshoe. Currently, only a few acres available at \$0.25/lb. (much lower than fall/winter prices). Using California 8046 variety.
- C.T. Smith/Peas Inc., Pleasanton, TX. Call the office first, (830) 569-2140. Dave Layton, mobile (210) 867-9367, dave@ctsmithco.com. Currently all BEP are fully booked, which Carl Smith notes rarely ever happens, but limited acres of some other specialty peas and beans are available. C.T. Smith's contracts with growers take delivery on the turnrow (they pay freight to Pleasanton).
- Superior Bean & Seed, Sudan, office (806) 227-2194, Jason Trotter, trotter0521@gmail.com, mobile (806) 891-3564. Black-eyed pea contracts have been full since January. Some pinto bean contracts available at \$31/cwt (variety Santa Fe).
- Texas Best Bean, Olton. Bobby Redwine, (806) 285-3144, texasbestbean@hotmail.com. 2016 contracts for black-eyed peas have been full since late last year. Delivery in Olton.

A few Texas A&M AgriLife resources for planting black-eyed peas are located at <http://lubbock.tamu.edu/programs/crops/other-field-crops/black-eyed-peas/>

Planting date. Black-eyes in the area from Muleshoe to Tulia can safely be planted up to about July 10, slightly later to the south. The crop requires about 80-90 days to maturity. Further production information is available from your contractor.

Cowpea family beans/peas and *Bradyrhizobium* peanut inoculants for fixing nitrogen. High Plains Extension survey work years ago suggested that fields which had never been in black-eye production before (or at a minimum, within the last 5 years) had lower *Bradyrhizobium* root nodule counts. We recommend that all BEP fields be inoculated, but this is especially important for long rotations from previous BEP. But there is good news! The same strain of inoculant, *Bradyrhizobium sp.* (Vigna), inoculates peanuts and black-eyed peas. Peanut inoculants may not mention the cowpea family of BEP on the label, but producers have expanded options to apply an inoculant if they can use granular or especially in-furrow liquid peanut inoculants.

Recent research on soybeans and Austrian winter peas in the Texas South Plains has shown much higher nodulation is achieved when the same seed-applied inoculants are sprayed in-furrow, which is the customary and preferred means of applying inoculant in peanut production. Thus some farmers have the inoculation equipment on their planters to do the same for black-eyed peas. I encourage you to consider this. Or lease a planter from a peanut farmer that has in-furrow application equipment. Previous observations on black-eyed peas and inoculants have been only for seedbox powder materials (much lower bacterial counts), which have been inconsistent if unsuccessful in increasing nodulation let alone yield. In-furrow liquid product costs run about \$8-10/acre. If seedbox powders are your only option, then consider a sterile peat inoculant with a sticker already in the inoculant, which has higher bacterial counts and adheres to the seed better than conventional seedbox powder inoculants. Wetting the seed will improve sticking of the inoculant, but this may be impractical for BEP seeding rates if you are planting very many acres.

Pinto bean. One current contract is noted above. Pintos are very susceptible to heat above 93°F during flowering and ideally should be planted by late April or after late June to minimize the heat. (Superior Bean prefers later planting, but plant by July 4 in the NW South Plains, July 10 in the central South Plains, and by July 15 in the lower South Plains.) Know in advance if the variety you are planting can be direct cut. Limited information on pinto bean production in Texas view the statewide Extension pinto bean guide at <http://aggie-horticulture.tamu.edu/vegetable/files/2011/10/pintobean.pdf>

Other peas and beans—Purple hulls, pinkeyes, crowder, mung, black, etc. In addition, some of the above contractors, especially C.T. Smith/Peas Inc., sometimes has limited contracts available on several other types of beans (including black and mung), peas, and small-acre seed blocks including crowder peas, pinkeyes, purplehulls, creams, etc. Superior Bean is testing mung beans and garbanzo beans (chickpeas). C.K. Nickels has recently contracted black beans. Call for current contract availability and price. Acreage is limited but many of these crops will readily fit a short-season window. Be sure to ascertain if there are any planting restrictions after certain herbicides or other chemicals such as Temik applied to cotton. For any other legume bean, there may be Rhizobium inoculants available you can use with each crop (contact Trostle for help finding them; likely from BASF or Verdesian).

Green beans. These were formerly contracted in the Parmer-Bailey-Castro-Lamb-Roosevelt-Curry Co. area. Due to financial troubles there is no current contracting. According to former Allen's contracting agent/field rep Doug Dillon, (479) 228-0201 (mobile)/(806) 481-3285 (answering machine), douglas.dillon@delmonte.com, Farwell, TX, planting might resume in a couple of years as Del Monte is investing in updating regional infrastructure. Green beans in the recent past were planted mid-June to mid-July, need ~60 days to harvest, with preferably up to 15" of irrigation. The crop cannot be planted after failed cotton where Temik was used. These green beans were not suitable for caliche ground or other ground where iron deficiency is anticipated. Five-year average yields were near 4.5 tons/acre. Input costs are substantial for seed.

Several other contract crops may be available on a limited basis. Contact any fruit and vegetable sheds in your area to learn of other crop possibilities.

Summer Sorghum/Sudan, Forage Sorghum, and Hybrid Pearl Millet Forages

These forages provide a low-risk option in replant and late plant situations for two reasons:

- 1) Physiological seed maturity is not required to complete the crop.
- 2) If forage production is shortened by fall weather, forage quality will remain high.

Summer annual forages such as sorghum/sudans, which have good regrowth potential after grazing or baling, will be planted on numerous acres in the South Plains in 2016 though hay prices are down. In 2002, FSA changed the planting date from June 30 to July 15 for full coverage NAP insurance (thus limited coverage is available into early August).

For a summary on current forage types including sorghum/sudans, forage sorghums, and millets (good for caliche soils due lower susceptibility to iron deficiency; no prussic acid problems) contact Calvin Trostle for a draft of a revised "Annual Summer Forages for West Texas," now joint with New Mexico State University. It includes a brief introduction to the brown mid-rib forages (generally lower lignin content, higher livestock palatability, and higher invitro digestibility) and photoperiod-sensitive forages (heads out in October regardless of planting date). Also, dryland and irrigated forage seeding rate guidelines have been revised in "Suggested Forage Seeding Rate Targets for West Texas" (contact Calvin Trostle as the document is not finalized and on the web yet). Both revised documents will be posted at <http://lubbock.tamu.edu/programs/crops/other-field-crops/forage/>, and in the meantime the older editions remain available.

Establishing summer annual forages in dry conditions—consider using a planter rather than a drill. In 2003-2004 (AGCARES, Lamesa, TX) and again in 2012-2013 due to minimal soil moisture conditions, Extension test plots were established in late June using a planter rather than a drill. We did not believe we had enough control over seed placement with our older drill hence establishment was more important to us than potential forage yield. We achieved excellent results using a planter on 40-inch rows. We were able to move soil to get to moisture which we could not have done with a drill. In spite of only 4.5” of rain in 2003 on the crop from late June through mid-October, we averaged 2.7 dry tons of forage per acre. Results were over 4 tons/A in 2004. We used a seeding rate of ~8-10 lbs./A, rather than the 15 lbs./A we would have used with a drill, which saved us about \$3-4/A on seed costs.

A take-home lesson from our Dawson Co. experience is that *establishment is important*, and if you have an older drill with limited ability to adequately place seed then using a planter may be a good idea, especially if you are on a 30-inch row spacing and soil moisture is marginal. In addition, grazing cattle will walk between the rows if the forage spacing is at least 20-24” hence they don’t tromp the stubble and regrowth potential is improved. For many drills, especially if drilling small-seeded sorgo-sorghum/sudan, plugging every other drill hole may be necessary to reduce seeding rates due to small seed.

Forage Sorghum Silage: Planting for silage can readily be conducted until early July (Table 1) so that longer season silage hybrids obtain soft dough. Shorter maturity silage hybrids can likely be planted through mid-July and still achieve good tonnage though quality may be reduced somewhat (see note on corn silage below). United Sorghum Checkoff Program funded preparation of a regional forage sorghum pocket guide, Western Forage Production Guide, which you may view online or download at <http://www.sorghumcheckoff.com/farmer-resources/forage-production/> To obtain a free copy, call USCP (806) 687-8727.

Summer forage seed production contracts: Numerous seed companies in the Lubbock-Plainview-Muleshoe-Hereford region contract seed production for hybrid grain and forage sorghums; hybrid pearl, German, and proso millet; hegari, early sumac, and other forages. Returning growers are usually given the first opportunity, but call area companies you are familiar with your inquiries, especially if you have grown seed blocks in the past.

Hybrid pearl millet. Millet is a leafy, high quality forage choice for late planting although if desired production extends into early October, sorghum/sudan may be a better choice as millets tend to shut down sooner in the fall. Millet is a good choice for caliche ground which causes severe iron deficiency in sorghum family forages, and hybrid pearl millet does not develop prussic acid. Millet seed, 70,000-90,000 seeds/lb., is much smaller than sorghum forages and may require reducing drill holes. Small seed precludes planting more than about 1” deep on most soils, so if moisture is marginal sorghums can be planted deeper. For further information, view the 2012 updated New Mexico State/Texas A&M AgriLife regional millet production guide at <http://lubbock.tamu.edu/files/2012/07/Millets-for-NM-West-TX-2012-A-417.pdf>

Millet and sugarcane aphid: Hybrid pearl millet is considered a poor host of sugarcane aphid, see “Hybrid Pearl Millet: An alternative to sugarcane aphid-susceptible sorghum family forages,” <http://lubbock.tamu.edu> In general HPM may have SCA, but they don’t colonize as well. Some reports in 2015 initially reported that millet was highly susceptible to SCA, but the millet tested was a garden store variety, and subsequent tests with commercial millets show much less damage than for sorghums. Millets should still be examined for SCA.

Soybeans

Soybeans may be an option on irrigated land where cotton failed. Soybeans further north in the Texas High Plains can yield fairly well under limited irrigation if irrigation is timely (flowering to mid-grain filling). Soybean production south of U.S 70 highway seems to more often have difficulty reaching yield potential due to heat, minimal rainfall support, etc. For that reason, I don’t encourage even primary crop

soybean production south of U.S. 70. For the Southern High Plains soybeans may be planted as late as July 10 and still make a crop, but yields are definitely lower (see below). Late planting usually retards stalk growth and can make it hard to harvest the lower seed pods. Higher seeding rates and narrower rows may encourage higher pod set.

Soybean maturity group. Data from the South Plains region suggests group IV soybeans remain the best choice for production even if planted in late June and early July. Though yields will decline with later planting, mid Group IV out performs group-III soybeans even when planted in early July. Regional research demonstrates that yields for maturity groups from mid-III to V did decline gradually from early and mid-May planting dates, but yield declines were substantial if planted after mid-June. Group III soybeans did not perform well on planting dates averaging June 16 and July 3 planting dates relative to group IV. Plants were very short. Determinate group V soybeans have performed well even at later planting dates. Texas A&M AgriLife research from the Amarillo area suggests that for each day after June 20 that soybean yield potential declines 1 bushel per day. Data from Hale County in 2000-2002 would support a similar conclusion for the South Plains.

Sulfonylurea-tolerant soybeans, or STS, may be planted on cotton ground treated with Staple herbicide. Availability of STS soybeans in the appropriate maturity group may be limited. Check with several seed dealers to see what might be available. STS soybeans are more commonly in the area now and do not have to be ordered. Otherwise, nearly all soybeans are Roundup Ready, so producers can maintain their glyphosate weed control program after failed RR cotton.

Seeding rates for soybean should reflect row spacing, available soil moisture, and irrigation. In general, for 40-inch rows with full irrigation, consider a seed drop at least 130,000 up to 150,000 seeds/A (10-12 seeds/ft.). In the past I have suggested that 10 seeds per foot should be adequate (~130,000 seeds/A on 40-inch rows), but if stand establishment turns out to be less than 75%, which is sometimes the case, then you don't have enough plants if fully irrigating. For more desirable 30-inch rows and high irrigation, consider 150,000-170,000 seeds/A (9-10 seeds/ft.), and for drilled seeding rates growers may push seeding rates as high as 180,000-200,000/A. Reduce seeding rates slightly for less than full irrigation and/or poor soil moisture at planting.

Rhizobium inoculant for soybean. Most cotton ground probably has not been planted in soybeans before. Soybean-specific Rhizobium inoculants are recommended to ensure proper nodulation on such ground. On the South Plains soybean inoculant choices include seedbox (both powder and newer seed applied liquid) and in-furrow granular or liquid inoculant. Although granular delivers more *Rhizobium* to the seed than seedbox powder treatments, costs may be considerably higher than seedbox treatments, and liquid costs are somewhere in between. If using a seedbox treatment I suggest you use the seed-applied liquid form and avoid the seedbox powder as I see little success with any dry seedbox inoculants among soybean and three other legume crops in the South Plains. The seed-applied liquids appear to be a significant improvement over seedbox powders (which may blow off the seed in an air-vacuum planter), but if you are still planting into dry soil then irrigating up you could lose much of the bacteria before the irrigation wets the soil. Texas A&M AgriLife data at Lubbock and Etter notes greatly increased soybean nodulation from using in-furrow liquid inoculants vs. the same material applied wet on seed. If you can apply liquid inoculant in-furrow, application is convenient and you will deliver the highest numbers of *Rhizobium* to the seed. Planters used for planting peanuts are normally equipped for applying liquid inoculant in-furrow.

As soon as growers decide they will plant soybeans, you need to locate *Rhizobium* inoculant. Some years I have found no farm suppliers with current-year inoculant on hand anywhere in the South Plains and very little in the Panhandle. If not available, then call regional sales reps for BASF/Becker Underwood, (515) 520-2170; Monsanto/Novozymes, (662) 326-0513; or Verdesian, (251) 294-0055, for information on how to obtain inoculum specific for soybeans.

Additional Texas Panhandle and South Plains production "Quick Tips" and irrigation information for

soybeans may be found at <http://lubbock.tamu.edu/programs/crops/other-field-crops/soybeans/>

High Input Alternative Catch Crops

In recent years some producers have asked about planting back to peanuts or corn. These crops were not covered in early editions of this replant guide due to the expectation of growers and the author that appropriate replant and late plant options after failed cotton would emphasize low-cost, low-input crops, which minimize economic risks by reducing financial expense when a crop has already been lost. My advice is caution if producers consider either of the following options. Visit with your peanut contractor, whose main concern may be a low grading crop, or your corn seed dealer for additional advice. Unlike other options discussed in this guide, significant irrigation will be required to pursue either of these options though corn increasingly is being grown in the region with lower target irrigation amounts, and I will briefly discuss dryland corn below.

Peanuts

Occasionally growers ask about late planting of shorter maturity Spanish peanuts or even shortest maturity Valencia peanuts in the northwest South Plains. This interest has expanded to our southern counties and companies have sometimes actively sought late-season contracts for Spanish peanuts. Even modest yields can still gross over \$500/acre though peanut market prices are much lower than a few years ago), but keep in mind that input costs (irrigation, seed, fungicide, etc.) are similar to full-season production thus significantly higher than other replant/late plant crops, and these higher input costs are in contrast to the goal of having low cost catch crops.

Although a few individuals have spoken to the contrary, I am averse to Spanish peanuts in a replant production system past May 28 in the northwest South Plains to about June 7 in Dawson and Gaines Cos. A significant acreage of Spanish peanuts was planted as late as June 20th in 2003 in Lamb Co., but for the most part yields most often did not reach one ton. One producer in Lamb Co. reported in 2003 that among 12 different fields his yields declined from near 4,000 lbs./A planted about May 12, to about 1,500 lbs./A ending with planting on June 3. Yes, a few individual growers have made 2,500 lbs./A or so with plantings as late as mid-June, but this is rare, represents risk, and has a strong potential for disappointment.

Let's put Spanish peanut production with late planting dates in perspective by looking at the issue of days to maturity for the recent common Texas A&M Spanish peanut line Tamnut OL06. Most Spanish peanut varieties require about 140-145 days for proper maturity in a normal year (maturation is dependent on heat unit accumulation, which slows considerably for later planted peanuts). For this crop planted on June 1 above Littlefield, the average killing frost is October 22nd. From June 1 then a 'typical' estimated maturity date is October 18th, within 5 days of a killing frost (Table 1 dates represent potentially ~1/2 to 3/4 of full-season yields). This is unnecessarily risky. And cool weather can be expected after September 20th to achieve much lower heat unit accumulation that far north in a typical year, thus making 140-145 days 150 days and longer. Grade will be lower. Each missed day of planting in late May and early June is equivalent to 2-3 days of delayed maturity in terms of heat unit accumulation in late September to mid October.

In more recent years Spanish has become a replant crop of interest to existing peanut producers in southern counties. There is more time to work with in this situation so at least the maturity concerns are alleviated if not the remaining underlying question of growing an expensive catch crop.

I do not recommend the small-seeded Spanish peanut AgraTech 9899-14 for late planting, which has a runner growth habit (used in the Spanish market as a high oleic peanut). It has a maturity at least 10-14 days longer than Tamrun OL06, and probably should not be planted after mid-May in Lamb Co. or late May in Dawson-Gaines.

Corn Grain & Corn Silage

Since the mid-2000's some short and medium maturity corn has been used to either double crop after wheat or plant in hailout situations from Lubbock north, and yields with substantial inputs can still achieve 10,000 lbs./A in some cases. Keep in mind, however, that the full-coverage crop insurance cut-off date for corn in all of the Texas High Plains is June 5. Shorter maturity corn hybrid adaptation and selection for the region has improved substantially in the past 10 years. In recent years especially since ~2008 more producers are considering late corn if prices are strong, which may lead to a greater return on investment which out-competes grain sorghum and other crops—if the grower is willing to spend for inputs. Some hybrids have short enough maturity (95-day range) that can fit the production system on very late plantings, but don't cut yourself short on maturity as yield potential is lower (high yields are commonly reported for corns with 105-110 day maturity, but less common at shorter maturities). And remember that short-season corn still has a highly intense water requirement. One company agronomist suggests that in Lamb Co. a corn maturity hybrid should be planted such that black layer can be obtained no later than October 15, which is only ~10 days before the average killing frost date at Littlefield.

As a guideline from private industry, one seed company offers that corn hybrids south of U.S. Highway 70 with a relative maturity (RM) of ~112-115 days should be planted by June 20; ~105 days RM, planted by June 25; ~95-99 days RM, planted by July 5. Other companies should have a similar range of hybrids. Other recent spring corn industry newsletters list examples of last recommended planting dates for Halfway, TX at July 4 for 93-day corn, and June 27, for 105-day corn. Keep in mind again, however, that planting 5 days sooner in June (or early July) is worth 10-15 days in late September or early October in terms of heat units for maturity. The risk you don't want to take is cutting yourself short on time to properly mature the crop, especially when the price is good.

Tips for late planting corn. Note the following pointers, courtesy Dr. Brent Bean, formerly Texas A&M AgriLife Extension agronomist, Amarillo:

- Replanting corn late in June is risky. Kansas data demonstrates that the same short-season corn hybrid planted on the 25th of April, May, and June had reduced corn yield of ~30% in June vs. May (Dr. Merle Witt).
- Choose a 90 to 100-day hybrid for late plantings. Even shorter hybrids could be chosen, but we have very little data on their yield potential. This may be similar to what we observe as noted in the grain sorghum section, where true early maturity grain sorghums simply don't have the yield potential that medium-early maturity has.
- Choose full insect protection including Bt. Late planting will greatly increase the risk of corn borers and earworms in corn (but spider mites are less).
- Choose a hybrid with good Fusarium tolerance as stalk and ear rots are more of a problem in late planting.
- Consider corn silage if possible (see below). It is much easier to grow 18-20 tons of corn silage than 160 bu/A corn when planting late.
- Consider increasing the seeding rate up to 15% as Kansas data suggests fewer kernels are produced per ear in late planted corn (consult seed dealer).

Corn for silage—Generally, the same corn hybrid planted for grain could be planted up to 14 days later if for silage. Late seeded silage corn can have similar risks as grain corn including stalk and ear insects, and though the tonnage may be made, starch content hence feed quality may be reduced compared to earlier plantings of the same hybrid (courtesy Rod Carpenter, Pioneer Hi-Bred, Farwell, TX).

Like peanuts above, corn is not a low-input catch crop as significant irrigation will be required to make a profitable yield.

What about dryland corn as a replant crop? A few areas are seeing some dryland corn, but some of the

early positive results, I believe, are attributed to high rainfall. For most of the Texas High Plains (except the eastern and northeastern Panhandle) dryland corn would be expected to be minimally successful in years with typical rainfall unless a large amount of deep soil moisture is present at the beginning of the cropping season. Seed costs alone in a replant situation will likely run 5 to 8 times higher than for grain sorghum. What seeding rates might be considered? We don't know, but for sure they have to be adjusted to deep soil moisture prospects, 8,000 to 12,000 seeds per acre, if deep soil moisture is moderate to high? If deep soil moisture is low, I suggest an appropriate dryland corn seeding rate be 0 seeds/acre, e.g., don't plant. Unlike, dryland replant grain sorghum where N fertilizer is normally not added, I think corn will still require N fertilization at some level if you expect to make yield as I do not expect corn roots to scavenge as well as grain sorghum for needed N in the soil.

Unknown to me at this point is how to choose a corn hybrid for a thin seed drop with regard to ear flex, potential multiple ears, etc. Your seed dealer may be able to help, but I would not want a corn hybrid in dryland that would possibly set a second ear. This is akin to my preference for a low-tillering/non-tillering grain sorghum hybrid for tough dryland conditions.

This publication is updated annually by mid June for the Texas South Plains.

For further Texas A&M AgriLife information for the Texas High Plains consult:

- <http://lubbock.tamu.edu>
- <http://amarillo.tamu.edu>
- Additional statewide Soil & Crop information, <http://soilcrop.tamu.edu>

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