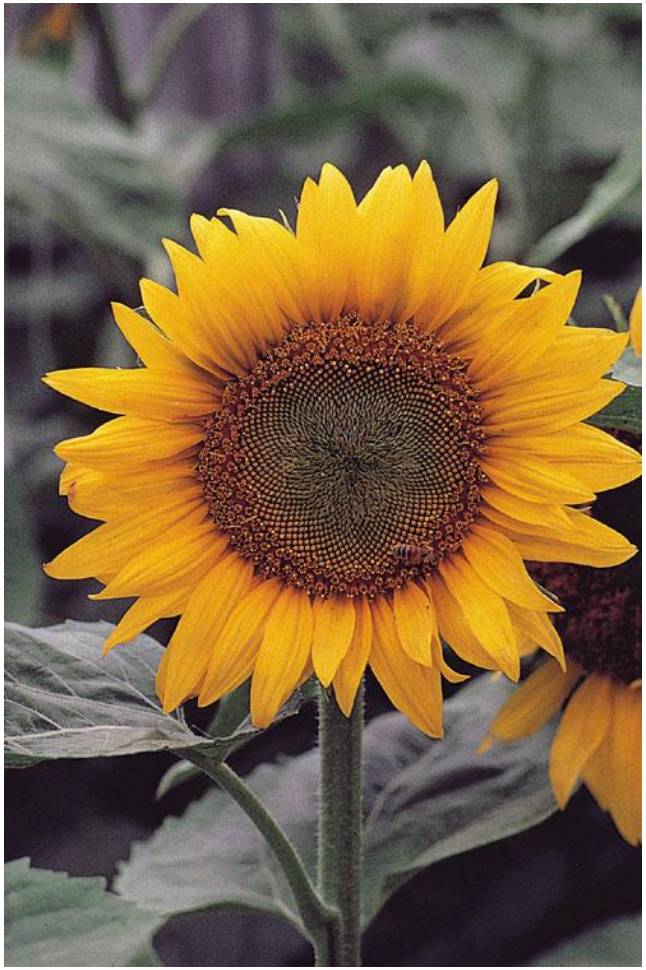
TEXAS A&M AGRILIFE EXTENSION

West Texas Sunflower

January 2014



Calvin Trostle, Ph.D.

Texas A&M AgriLife Extension Service

(806) 746-6101, ctrostle@ag.tamu.edu

Sunflower Production in Pictures

- Some of the most important things you need to know about sunflower production in Texas

And Ultimately *Rhizopus* Headrot

"Styrofoam Bricks!"

Are these pictures worrisome?

- Don't let them be—just be informed
- The good news is that sunflower head moth is manageable—We know:
  - How to scout (if we don't just automatically spray, our apologies to IPM practices)
  - When to spray
  - What to use
  - To follow up to ensure the first spray is OK
- This just happens to be a major downfall of too many inexperienced, first time, or "a-couple-of-days-too-late" growers

In the Past

- Confectionary sunflower historically most common in Texas High Plains (2/3 of acres), but oilseed has increased
- Confectionary pricing is two-tiered, depending on having a higher proportion of large seed >20/64”
- Graded harder than oilseed, discounts could be significant
- Confectionary yields lower?—Perhaps slightly? More costly to grow?—Somewhat

Initial Considerations

- Price & delivery options
- Your crop rotation
- Harvest equipment
- Herbicides—last season's residual, currently available labels
  - See Extension summary for list
  - What are your main weeds?
- Are you good at—willingly—taking care of potential insect problems in a timely fashion?

Initial Considerations

- Crop insurance—in 2014, sunflower full coverage available for most High Plains counties from Lubbock and north (plant by 6/25)
  - See eligible counties at http://www.sunflowernsa.com/growers/crop-insurance/
  - Dawson & Lynn Counties added in 2012
  - If program is not in your county then you will need to work with a crop insurance agent requesting coverage, which may or may not be approved (will need any yield history you have, county history, etc.)

TX High Plains Yield Goals

Initial Soil H_2O	No Irrigation	Limited Irrigation	Full Irrigation ~12″
	----------	-- Lbs./A ---	----------
Poor	600-800	1,000-1,600	1,400-2,000
Good	1,000-1,200	1,600-2,200	2,000-2,600

Abundant deep soil moisture makes a difference as sunflower can root to at least 6', even 8' deep. Some years are exceptional and even higher—or lower—yields occur.

Confectionary Sunflower

- Texas South Plains: Usually best yields if planted mid-April to mid-May; less variation in Panhandle?
- 2014 Markets (call for recent pricing)
  - Red River Commodities, Lubbock, 800-763-9740 (several delivery points in South Plains, Panhandle), $36/22 cwt. (contracts full as of Jan. 30, 2014)
  - SunOpta, Goodland, KS 800-742-9259 (bids may come)
  - Erker Grain, Ft. Morgan CO (offering Olton delivery in South Plains; Panhandle?), 970-867-3371
  - Bailey Grain, Ft. Worth, TX (call for delivery sites & price), 817-731-6341

Confectionary Priced by Seed Size

Per 1,000 lbs./A clean yield

Pricing	% Seed >20/64"	Crop Value/$A
$34/22 cwt.	80.0%	$316 (+5.3%)
$34/22 cwt.	66.7%	$300
$34/22 cwt.	50.0%	$280 (-6.3%)
Flat rate, $30/cwt.	No seed check	$300

2010-2011: Three Texas A&M AgriLife trials gave 48, 57, & 75% large seed.
TX High Plains research notes reduced seeding rates significantly increase large seed.

Assessing Yield vs. Crop Value
2010 Confectionary--Lubbock, TX

Yield (Lbs./A)	Rank Based on Yield	Crop Value ($/Acre)	Rank Based on Value	Value Rank vs Yld Rank
2,366	1	$533	1	0
2,169	2	$477	3	-1
2,111	3	$497	2	+1
2,056	4	$453	5	-1
1,981	5	$451	6	-1
1,933	6	$367	9	-3
1,865	7	$447	7	0
1,848	8	$459	4	+4
1,742	9	$369	8	+1
P = 0.0007		P = 0.0017		
PLSD = 230		PLSD = $67		

Oilseed Characteristics

- **Sunflower Oil Market**—40% oil is standard
  - Premiums paid for > 40% (usually 2-for-1)
  - Discounts for < 40% (usually 2-for-1)
    - Lower oil factors: a) late planting with insufficient time to mature, b) hot dry conditions, more likely to affect dryland
  - Typical range 38-45% in Texas High Plains
  - Example (2013): $24.00/cwt and a sunflower field achieving 41% oil yield pays at $24.48/cwt.
    - Each 1% of oil is premium/discount of $0.48/cwt.
  - Birdfood oil sunflower will not check for oil content
  - Test Wt.--Typically range from 28-32 lbs./bu for oils

Markets & Pricing

Acre Contracts—High Plains

- **Oilseed**--Dark seeded
  - Three oil types: "NuSun" mid-oleic fatty acid is most common; High oleic (HO); Traditional oil (now rarely if ever grown)
- NuSun & HO make good biodiesel, but they are usually worth more, even much more, in the food market
- Some markets price high oleic $1.00-2.00/cwt higher than NuSun

Oilseed Sunflower, June 2014

Call for current pricing…

- California Oils contracting through Eastern Colorado Seeds (ECS), delivery in Dalhart, Olton, Brownfield; also on the turnrow (primarily high oleic, or HO, oilseed), 806-241-8644 (Kelly Jack)
  - ~$21/cwt.
- Northern Sun, Goodland, KS, 800-542-7333 (ship direct or handle through ADM-Guymon), 800-542-7333
  - Call for pricing and delivery location; HO $21.75/cwt; NuSun, $2-3/cwt. less
- Colorado Mills, delivery to Lamar, CO, 719-336-8452
  - High oleic, $22/cwt.; NuSun, $20/cwt.
- All the above at 2-for-1 premium/discount per 1% oil (base 40%)

Oilseed Sunflower (Birdfood)

- Red River Commodities, Lubbock, 800-763-9740
  - $20/cwt. (June 2014)
  - No premium/discount for %oil content (not checked)
  - Choose whatever oilseed hybrid you want
  - 2014 delivery in Hale Center

Prospective Grower's Perception of Sunflower

- Hoping for a home run on a "low-input crop"
- A higher percentage of first-time sunflower growers have negative experience than with any other field crop
- How many growers have said, "Yeah, I grew sunflowers once, and I'll never do that again…"
- Why?

Sunflower Growers' Concerns

- Sunflower (head) moth--"I never knew…"
  - "The boll weevil of sunflowers"
- "Sunflowers were hard on my ground"--reduction in next year's crop yields?
  - Deep water extraction
  - Inadequate fertility (<5-6 lbs./N per 100 lbs. of production)
- Volunteer sunflower next year

The Irony of Sunflower

- Sunflower is often cussed for the very reason it can be highly successful
  - It might happen the year after sunflower

- Removal of N and soil moisture is highly efficient during sunflower growth

Know this about Sunflower

- For agronomically sound production, avoid the "low input" mentality--it gets farmers in trouble

- There is probably a higher percentage of frustration or disappointment among first-time growers than any other crop: lack of education, lack of patience, key mistakes

Plant Population

- Think in terms of seed drop per acre, especially for confectionary, where yield of large seed is worth almost twice as much
  - Lower plant populations tend to produce significantly higher proportion of large seed
- Narrower row spacing favors higher yield, especially if you are pushing top yield potential

Hybrid Seed Characteristics

- Confection
  - In-shell (confection types only)
  - Kernel or hulling (dehulling minimal in Texas)
- Oil
  - Linoleic (regular oil type)—not grown much anymore
  - NuSun (mid-oleic > 60%)
  - High oleic (> 80 or 85%)
    - Increasing market share—price premium often available

Planting Seed Characteristics

- Oil Types
  - Seed sizes - #2, #3, and #4 (#2 is largest)
  - Research suggests that, provided you get a stand OK, that seed size doesn't appear to affect crop yield
  - Packaged in 130,000 to 225,000 seeds/bag depending on seed size with same seed price per bag (per acre cost less with smaller seed)
- Confection Types
  - Seed sizes - small, medium, large and ex-large
  - Packaged in 75,000-100,000 seeds/bag

Seed Characteristics

- **Planting Oilseed**
  - Size 2 : 4,000 to 5,000 seeds/lb.
  - Size 3 : 5,000 to 6,500 seeds/lb.
  - Size 4 : 6,500 to 8,000 seeds/lb.

Seed Insecticide Treatments

- Seed insecticide treatments are now mostly standard across the industry
- Gaucho, Poncho, CruiserMaxx (which also includes fungicide)
- The latter two can add significant cost to seed
- Generally 45 days of protection is about the limit of expected protection
- ?Some protection from wireworms but not carrot beetle

Seed Treatments

- Gaucho, Poncho, CruiserMaxx (which also includes fungicide)
- The latter two can add significant cost to seed
- Generally 45 days of protection is about the limit of expected protection
- ?Some protection from wireworms but not carrot beetle

Seed Rate & Controlling Risk

- Manage drought risk with modest seed drop per acre
- Especially for dryland, adjust typical seed drop down to poor soil moisture conditions (down but not up)
- Don't increase seeding rate above suggested targets based on excellent soil moisture at planting--that's risky

Planting Conditions

- Firm seedbed for even emergence else sunflower head moth control will be more difficult
- If planting moisture is low, growers debate whether it is best to water first then plant, or water after planting
- More even stand is probably obtained by watering first then planting into moisture
  - If water after planting, you create a 2-4 day differential in bloom when you spray for head moth

Reduced Seed Drop--Dryland

- What is the goal: "The goal is to make a crop, not a mistake" (e.g., too high seeding rate)
- e.g. Dawson Co. hybrid trial, 2001
  - "Less is more"--minimal seeding rate achieved ~11,000 plants/A
  - 782 lbs./A , 2.3" rain during growth
  - But 18,000 plants/A yielded 580 lbs./A
  - Deep rooting with moderate subsoil moisture

Planter Importance

- Use air-vacuum planter for even spacing—
  - Lease this planter, or have a neighbor plant it for you; avoid plate planters.
- Limit over-seeding
- **Calibrate** any planter to verify seed drop
- For confectionary or any dryland, it is especially important to uniformly space seeds

Planting

Planting direction

- North/South vs. East/West rows?
- North-South probably better as typical hybrids ‘turn down’ thus heads hang between rows facing downward after bloom is complete
- Harder for birds to feed
- Less damage and shattering during storms

Oilseed Sunflower Planting

- Think in terms of seed drop per acre with a range of plant establishment of 70-90% of seed
- Dryland, ~14,000-18,000 seeds/acre
  - ~1 seed per foot on 30” rows (17,500 seeds/acre) or 1 seed per 9” on 40” rows (13,068 row-feet X 1.33 = ~17,500 seeds/acre)
  - Range reflects availability of deep moisture
- Irrigated, ~20,000-23,000 seeds/acre if significant irrigation (~6-10”)
  - Top end irrigation levels may consider oilseed at 24,000-26,000/A, especially if on 30” rows or narrower

Oilseed Sunflower Planting

- Texas oilseed seeding rates are lower than rates suggested for Kansas-Colorado where growers are instructed to plant for a target plant populations, which are similar to Texas seeding rates
  - Companies often recommend more than Texas recs as well
  - Why lower in Texas? Hotter conditions, sandier soils with less water holding capacity, etc.

Dryland Seed Rate Summary

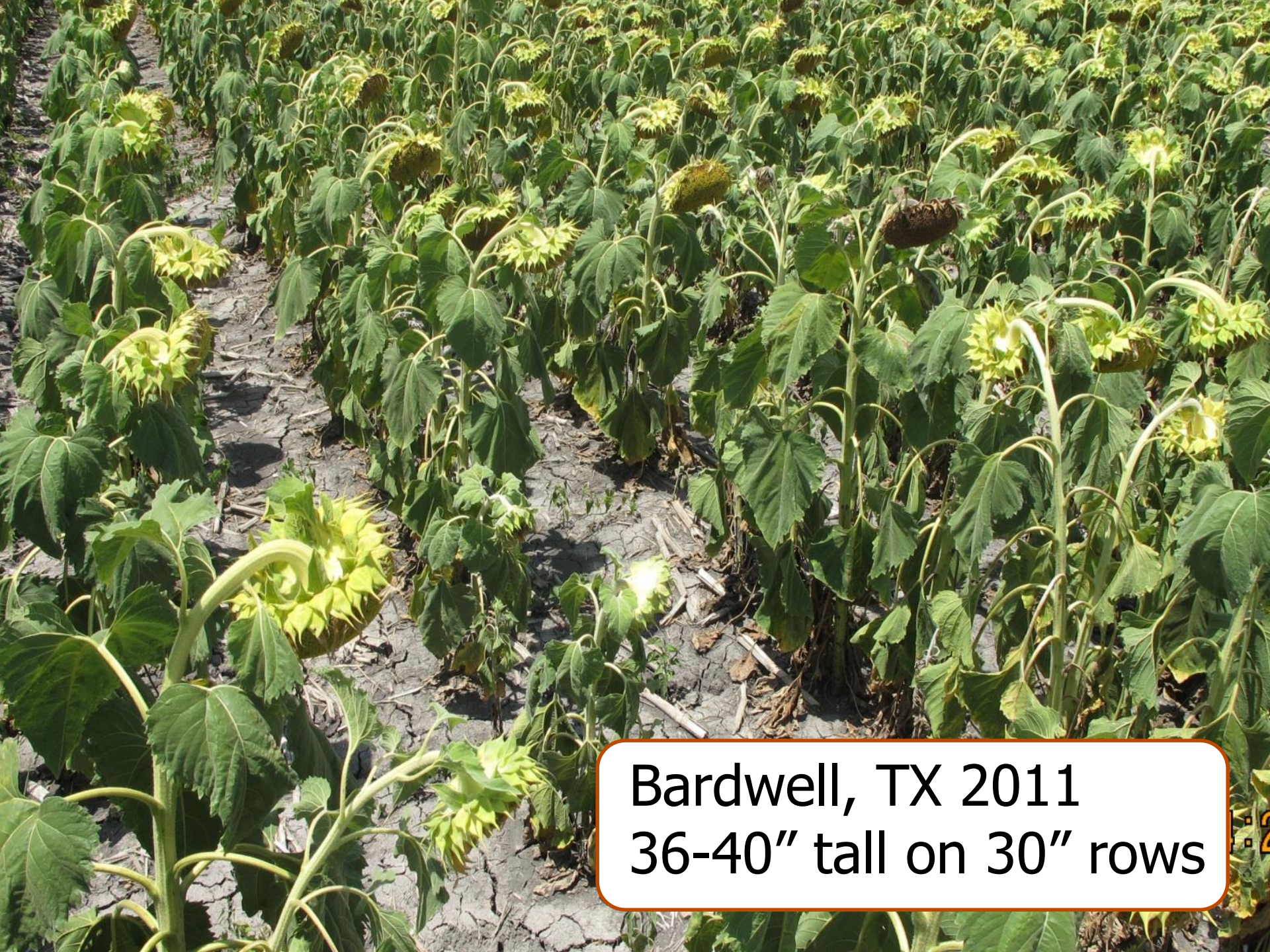
- Seeding to obtain a modest plant population is agronomically and economically less risky than seeding a higher plant population when droughty conditions are possible

Oilseed Hybrid Choices I.

- NuSun (mid oleic) or High Oleic
  - Industry is moving to high oleic (doesn't matter for birdfood)
- Short Stature sunflowers that are 3.0-4.5' tall when irrigated; current SS hybrids average 1-2' shorter than conventional height hybrids
  - Yields now similar to tall flowers, may allow you to spray with a ground rig, less lodging potential
  - Oil content has been higher than average oilseed hybrid (probably reflects the southerly breeding program that brought short stature to market)
  - Some hybrids marketed as short stature should probably be called 'reduced height' as they are not short enough to drive through for insecticide or herbicide applications or later cultivations

Oilseed Hybrid Choices II.

- Herbicide tolerance
  - Clearfield ("IMI" or imazamox) from several companies (spray with Beyond, $$)
  - Clearfield Plus arrived in 2013—same rate and timing of Beyond but use COC or MSO rather than NIS for hotter activity (do not do on standard Clearfield)
    - Must spray by V8, which may be no more than 3 weeks after planting
  - ExpressSun "SU" sulfonyl-urea tolerant (Pioneer, also Seeds2000, Croplan, spray with Express)
    - Can spray to just before initial bud formation ("R" growth stages), likely 2-3 weeks longer than Clearfield


Bardwell, TX 2011
36-40” tall on 30” rows


Height differential between short-stature sunflower and conventional height is often not that great (Triumph s670CL in foreground).

2008-2011
TX Panhandle Oilseed Hybrid Trials

Year	Hybrid Type	# of Hybrids	Height Avg. (in)	Height Range (in.)	%Oil Content	Yield (Lbs/A)	Crop Value ($/A)
2008	SS	5	45	38 to 51	40.4	2,292	$564
	Conv	21	60	47 to 71	37.8	2,113	$493
2009	SS	5	52	49 to 59	47.1	2,646	$550
	Conv	28	73	62 to 90	44.8	2,609	$523
2010	SS	4	55	51 to 59	43.1	2,407	$402
	Conv	22	71	63 to 77	40.7	2,515	$395
2011	SS	3	42	41 to 44	41.2	2,168	$621
	Conv	25	56	48 to 66	41.3	2,237	$643
4-Year	**SS**	**17**	**48**	**45 to 53**	**42.9**	**2,379**	**$534**
	Conv	**96**	**65**	**55 to 76**	**41.1**	**2,368**	**$513**

Lodging, all kinds: SS, 2.0%; Conventional height, 3.7%

2008-2011
Lubbock, TX Oilseed Hybrid Trials

		Height	Height			Crop
Hybrid	# of	Avg.	Range	%Oil	Yield	Value
Type	Hybrids	(in.)	(in.)	Content	(Lbs/A)	($/A)
SS	15	47	44 to 51	43.2	2,184	$494
Conv	80	60	50 to 69	41.0	2,036	$453

Lodging, all kinds: SS, 0.4%; Conventional height, 2.5%

TX Crop Testing Comparison: Short-Stature Oilseed Height

Location	Year	Short Stature Oilseed	All Other Oilseed	Confec-tionary
Corpus Christi	2010	34-42”	45-56”	52-58”
	2011	*34-37”*	*44-53”*	*41-56”*
Central TX	2010	55-56”	67-79”	67-83”
	2011	*41-48”*	*57-69”*	*65-76”*
Lubbock	2010	54-57”	54-74”	56-75”
	2011	*34-41”*	*46-54”*	*47-58”*

Multi-Year Oilseed Comparison TX High Plains, 2008-2010†

Oilseed Type	Average Yield (Lbs./Acre)	Average Oil Con-tent (%)	Average Crop Value ($/A)
NuSun	2,483	41.4%	$494
High Oleic	2,403	41.2%	$500
Short Stature‡	2,504	42.8%	$516

†Five irrigated tests sites at Lubbock, Halfway, or Etter, TX where oilseed price is usually slightly higher for HO.

‡Mostly NuSun but also some HO; all from Triumph Seed.

Hybrid Choices

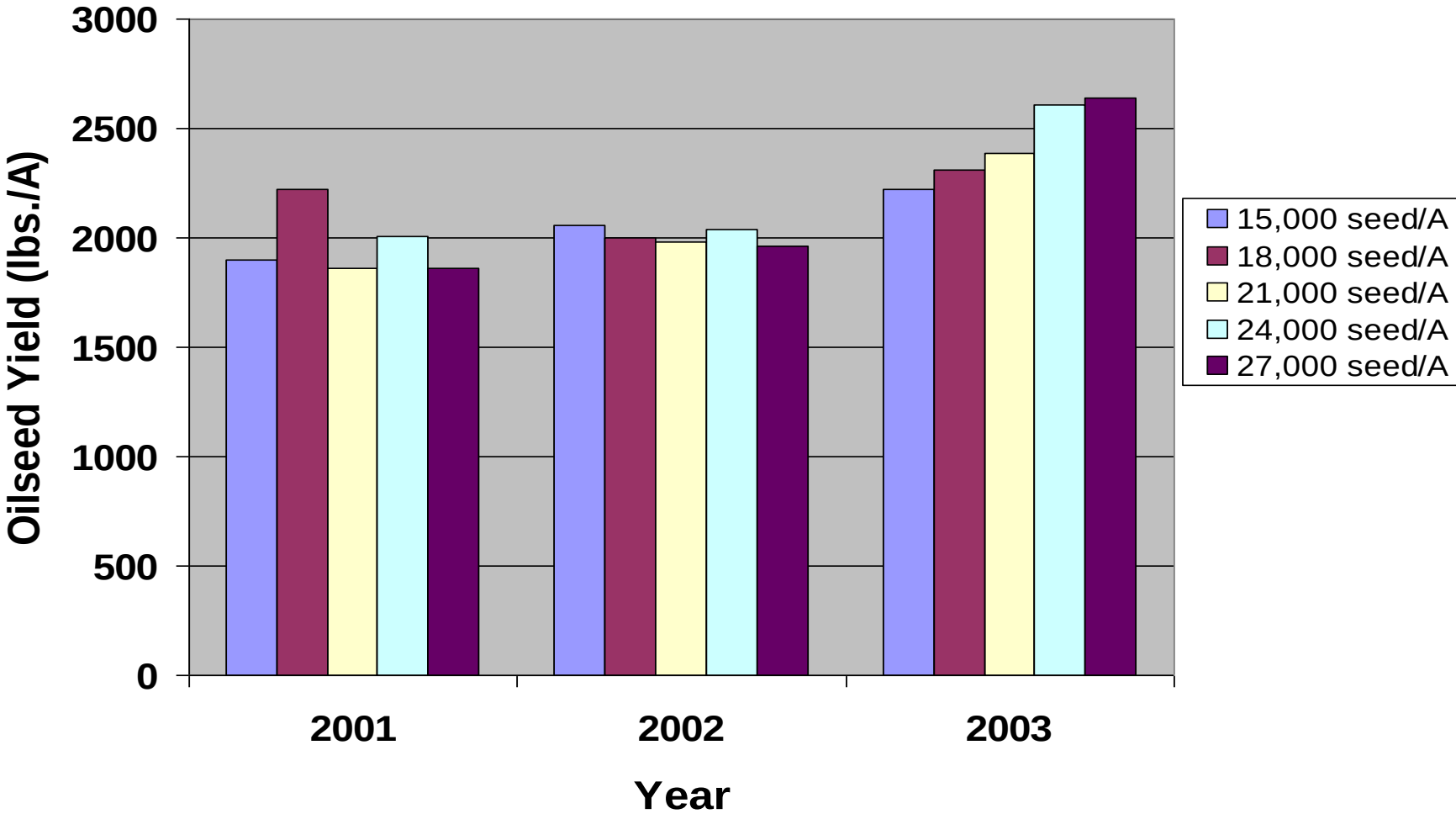
- Some hybrids, notably Triumph, have good rust tolerance
- Downy mildew resistance doesn't appear to offer advantage in TX (we have powdery mildew, esp. along Gulf Coast)
- No insect resistance
  - What about seed treatments (e.g., Gaucho, Cruiser Maxx)—treated seed is the only choice now from most seed companies
  - No seed treatment research in Texas. Can protect against in-furrow insects (true & false wire worms), some stalk boring insects
- Bird "resistance"
  - Most hybrids now tip downward after flowering, but some remain semi-erect (e.g., older Pioneer NuSun) and are more susceptible to potential bird damage

Oilseed Hybrid Choices

- Main suppliers in Texas Market to date
  - Mycogen/Triumph Seed (one line beginning 2015)
  - Pioneer
  - Croplan
  - Seeds2000/Nuseed
  - Syngenta
  - Dekalb
- Texas hybrid trial data is only in High Plains and only for irrigation, but 3-year results are at http://varietytesting.tamu.edu
  - Confectionary results also available
- Yields in High Plains usually similar for oilseed vs. confectionary, but if there is a difference usually confectionary is higher

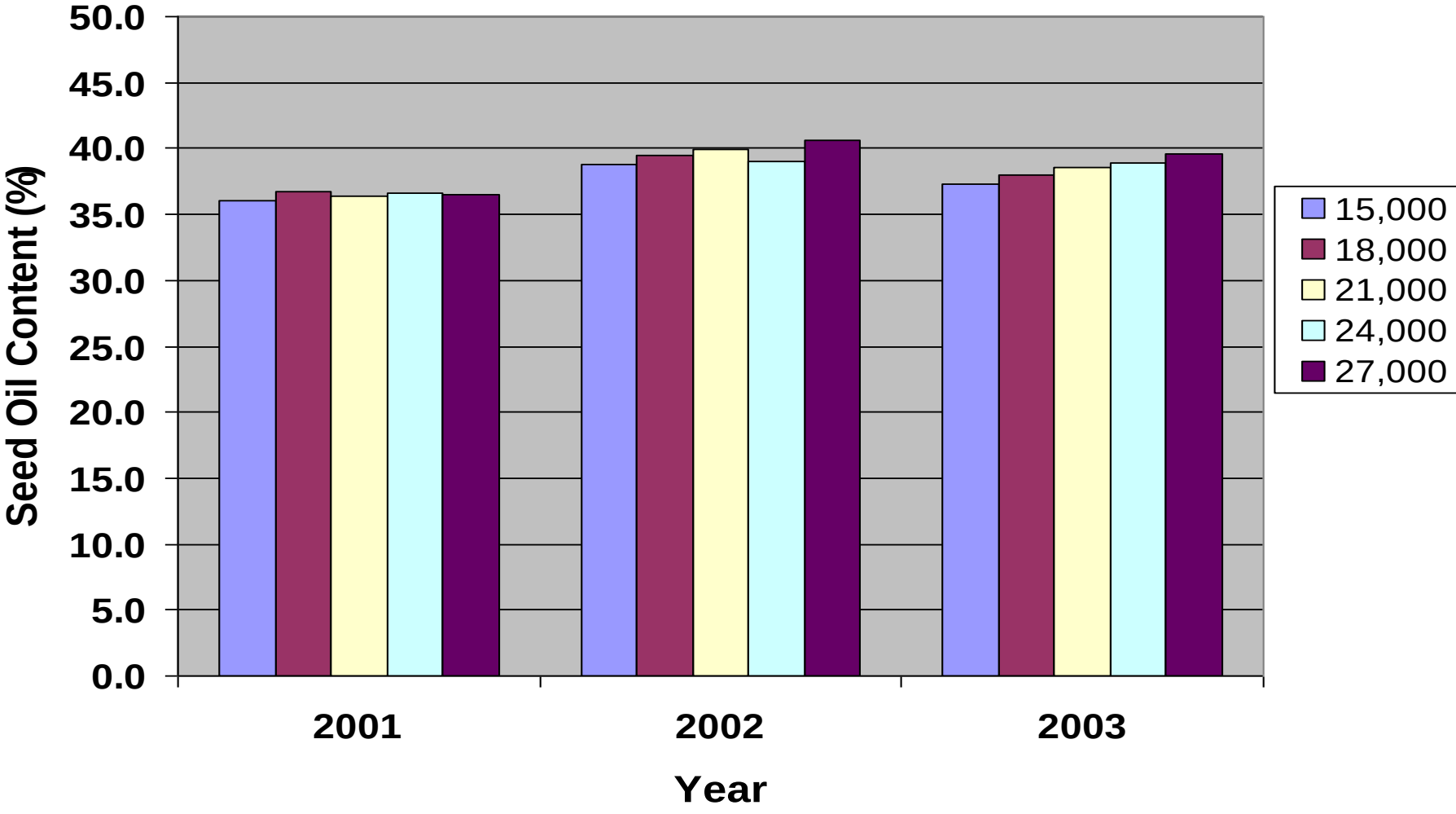
Seed Rate for Irrigated Oilseed Yield

Halfway, Texas



Irrigated Seed Rate & %Oil

Halfway, Texas



Confectionary Seeding Rate

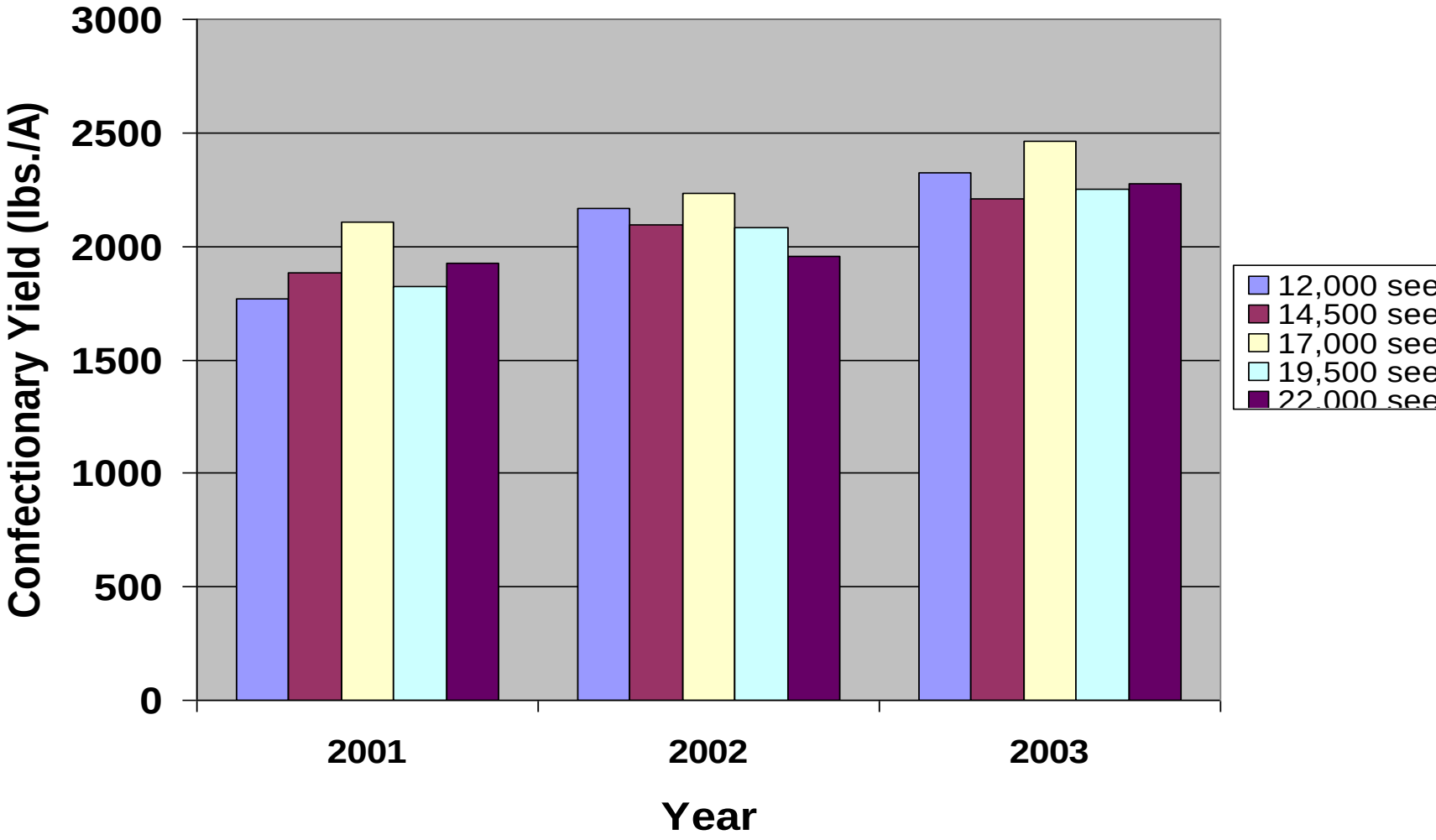
- LESS (seed) is MORE ($)! Large price premium for large seed
- Restrict plant population on top end
  - Irrigated, 16,000-18,000 seeds/A
  - Dryland, 12,000-14,000 seeds/A
- Air/vacuum planter
- Assumes 85% stand and upward flex for thin stands or skips

Sunflower Planting

- Firm seedbed, moisture
  - By comparison, confectionary being a larger seed, needs to imbibe more moisture, may have less uniform stand
- National Sunflower Assn. field surveys in the Texas High Plains: "What is the biggest yield-limiting factor?"
- About 50% of the time: skippy stands, e.g. lack of uniform plant spacing
  - Not plant population, but the spacing of whatever plant population one has

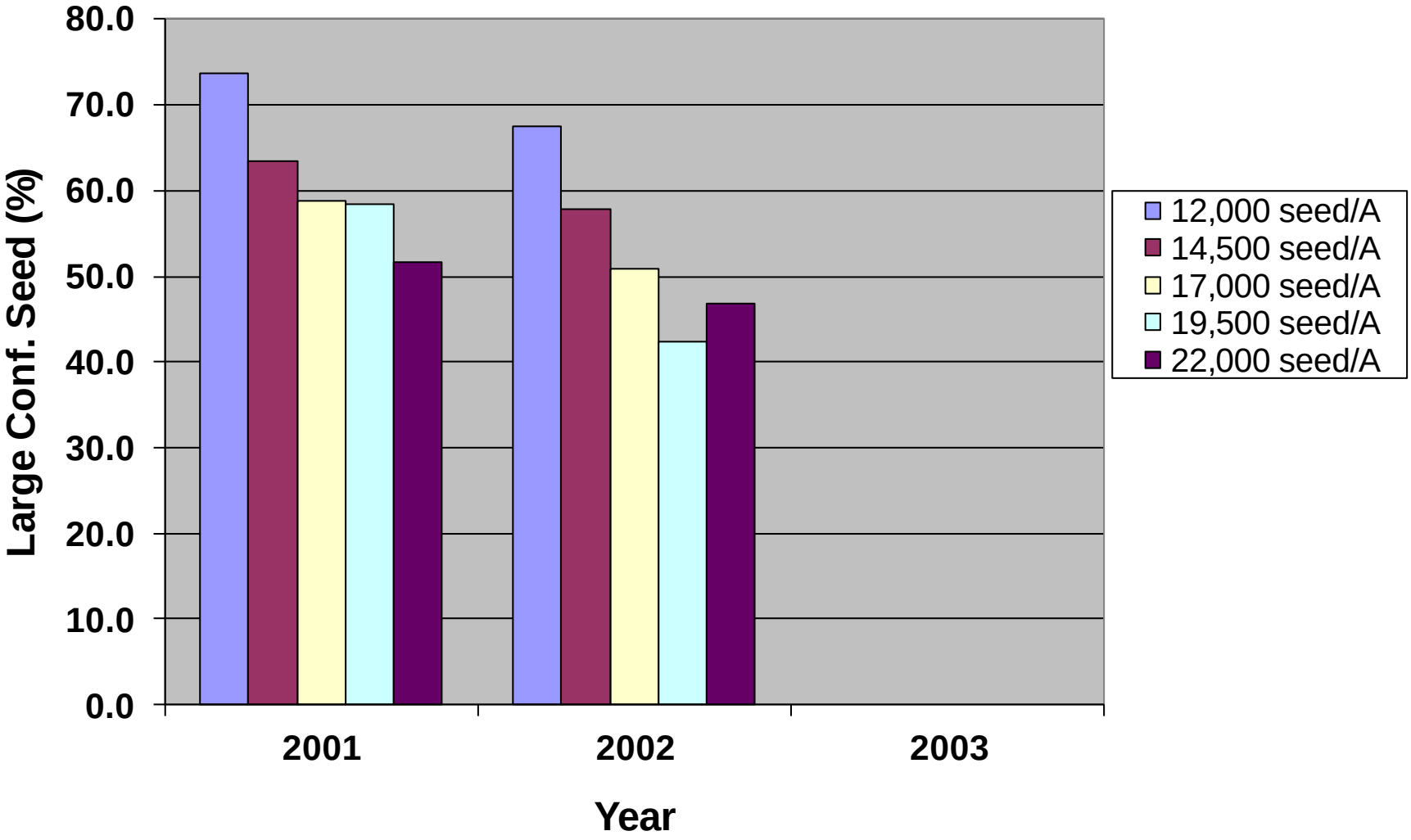
Seed Rate for Irrigated Confectionary Yield

Halfway, Texas



Irrigated Confectionary Seed Rate & Large Seed

Seed > 20/64”, Halfway, Texas



TX High Plains Plant Dates

- Minimum average daily soil temperature of 50°F required (similar to corn)
- Don't plant more than 1 week before last average spring freeze to ensure adequate germination conditions and early growth
- Sunflowers can tolerate a light freeze (28°F), though they may be more sensitive in the seedling stage than in the fall nearing maturity

Average Last Spring Freeze Date

Dalhart	4/23
Dumas	4/18
Muleshoe	4/17
Plainview	4/10
Plains	4/5
Lamesa	4/3

Oilseed Planting

- Rolling Plains—early sunflowers possibly by late March
- High Plains—Typically begin mid-April in the Lubbock region and slightly later to the north; target with average daily minimum soil temperatures ~50°F (like corn) extending to early or mid July

TX High Plains Early Delivery

- Sometimes an oilseed contract may offer a premium for early delivery (e.g., August)
- When to plant to meet this target?
- ~120 days sooner plus allow an extra 7-10 days to deal with dry down, combining, etc.
- Use of desiccants/harvest aid to hasten harvest and meet delivery incentive?:
  - If bonus is $1/cwt bonus, harvest aid chemical & application cost must be: <$20/A for 2,000 lbs./A crop; <$10/A for 1,000 lbs./A crop (if dryland, couldn't justify)
- Planting potentially lower yielding early maturity hybrid probably not worth sacrificing yield

West Texas Planting Dates

- Historical plantings through early May have:
  - Highest head moth potential
  - Higher stem weevil potential
  - Higher yield potential
  - 1-2% higher oil content (Colorado & Kansas)
    - Typically expect that later sunflowers will have reduced oil content

Last Recommended Planting Dates, TX High/Rolling Plains

- Extension offers a conservative LRPD highly likely to provide for full mature crop production in all but the worst of fall conditions (**Tier 1**)
- Production can be successful planting up to 10 days later, but yields & oil content can be significantly down (**Tier 2**—7 days after Tier 1)
  - Sunflower can tolerate temps down to 28 F without significant injury but growth slows
  - Kansas recommendations suggest for best potential yield, %oil, test weight, sunflower should mature within the frost-free growing season
- Can choose shorter maturity hybrid for Tier 2

Last Recommended Planting Dates, TX High Plains (Tier 1)

- July 1, Dallam, Hartley
- July 5, Sherman-Ochiltree, Moore-Roberts, Oldham-Carson, Deaf Smith, Randall, Parmer, Castro, Bailey, Cochran
- July 10, Lipscomb, Hemphill, Gray, Wheeler, Armstrong, Donley, Swisher, Briscoe, Lamb-Floyd, Hockley-Crosby, Yoakum, Terry
- July 15, Collingsworth, Hall, Childress, Motley, Dickens, Lynn-Kent, Gaines-Fisher, Andrews-Nolan
- Other Rolling Plains counties—July 20, but earlier is preferred
- Tier II, which has some risk, is 7 days later.

Late Planting Date Examples

- NW of Dalhart, 2004 (LRPD July 1)—Irrigated up July 10, oilseed yields at ~2,000 lbs./A but oil content only 32%
- Etter/Moore Co., 2009 (LRPD July 5)—Planted July 8, yields excellent & oil exceptional at 45%, but a few longer season hybrids rated as not fully mature, 26°F on Oct. 10-11
- Bailey & Cochran Cos. (LRPD July 5)—Recent years, several producers planting past July 20, yields and quality (conf. or %oil) acceptable in most cases, but 2009 crop was poor and some not marketable

Avoid Summer Heat at Flowering?

- Like High Plains dryland sorghum growers, especially from Lubbock south, dryland sunflower might consider planting to avoid flowering from early July to mid August
- Thus May 10 to June 20 plantings might be minimized
  - But if soil moisture is good, it is less a concern

Sunflower Growth Stages

- For a commonly used scale, see http://www.sunflowernsa.com/growers/growth-stages/
- Begins with VE (vegetative emergence) through "V-#" (vegetative growth with the number of leaves
- Reproductive "R" stages, including sunflower bloom (R-5.1 to R-5.9)

V-4

R-5.5

Sunflower Irrigation

- Critical at 20 days before flowering (bud stage) to 20 days after flowering (petal drop)
- High water use begins at bud (“R”) stage, peaks at flowering
- Confectionary often irrigated more to ensure good seed size and quality

Early bud stage (R-2): begin significant irrigation
Flowering (R-5.9)
Petal drop (R-6): cease irrigation if soil moisture is good.

Sunflower Growth

- Growth is heat driven
  - Sunflower planted in early June might flower 7 days faster than if planted in mid April
- Texas A&M AgriLife trial hybrids, at a range of planting dates, reach "Half Bloom" in 52-57 days at Lubbock vs. 2-3 days longer at Dumas in the same year
- This will help you project needed insect control
- 90-105 days to physiological maturity; another 10-15 days to harvest maturity

Optimum Irrigation

- Early overwatering may limit rooting depth thus curtailing potential drought tolerance & deep moisture extraction
- Irrigation benefits: Early bud (1/2”) to petal drop, and esp. at initial flowering

Sunflower and Avail. Water

- 1” water = ~140 lbs. yield/A (KS/CO) in normal year; first 5-7” needed to get sunflower to point of seed production
  - Perhaps 4-5” for low plant population dryland sunflower
- Example--
  - ~5” soil water at planting, 8” of rainfall during physiological growth
  - ~13” total available - 6” for vegetative growth = 7” for seed production
  - Potential = 140 X 7 = ~980 lbs./A

Optimum Irrigation

- Preplant irrigation for sunflower can have longer benefit than for other crops
- In the old days **two timely** mid-season row-water irrigations target--
  - first primary watering at bud swelling = 0.5-1.0” diameter
  - second watering at full bloom
  - set ‘by the book’ guideline aside in drought and water sooner if needed

Clovis Sunflower Irrigation

Irrigation (inches/season)	2007	2008	2009
	Seed yield (lbs./A)		
0	1,343	1,809	2,202
3	1,937	2,772	2,927
6	2,501	3,699	2,857
9	2,145	3,740	3,133
12	2,716	4,055	2,802
6 early, 0 late	2,529	3,284	2,979
0 early, 6 late	2,487	2,297	3,158
LSD (0.05)	799	945	948

Optimum Irrigation

- Efficiency & economic return with first 5-10” of irrigation water on sunflower--applied at the optimum time is better than most other crops
- Limited irrigation in many years produces yields similar to full irrigation (K-State Research & Extension)
  - Provided nutrients are not limiting

West Texas Sunflower, 2001

What we learned in a hot, dry year

- Heat and little rainfall—difficulties observed in pollination/seed set on many hybrids (and low % large seed for confectionary)
- Highest sunflower head moth pressure in 20 years
- Lodging from soybean stem borer a/k/a stalk girdler (*Dectes texanus*)

West Texas Sunflower, 2001

What we learned in a hot, dry year

- In 2001, yields near 700-800 lbs./A for well-managed crop receiving ~7” of irrigation applied in timely fashion
- Why the low yields?

West Texas Sunflower, 2001

What we learned in a hot, dry year

- 1″ water = 140 lbs. yield /A in normal year; first 6 inches needed to get sunflower to point of seed production
- ~2″ soil water at planting, 2″ of rainfall
- ~11″ total available - 6″ for vegetative growth = 5″ for seed production
- Potential yield around 750 lbs./A

Sunflower Yield Contrast

- On the other hand, a dryland sunflower crop with a favorable combination of rainfall and/or ample deep soil moisture will readily yield toward 1,500 lbs./A
  - Provide enough N is available
- A well managed sunflower crop on dryland should base budge projections on 1,000 lbs./A, perhaps slightly less in the sandier soils of the lower South Plains
  - Deep soil moisture will significant impacts projections

Sharing Irrigation Water

- Early planted sunflower (early April) and final irrigation occur about the time that cotton irrigation is needed (e.g., Mitchell Jansa, St. Lawrence, Glasscock Co.)

Split Pivot Scenarios

- Pairing two irrigated crops
- What strategies can you consider?

Split Pivot Scenarios

- Pairing two irrigated crops
- What strategies can you consider?
- One crop is your main focus, the other may be managed in such a way that it 'goes dryland' if needed.

Sunflower Irrig. on Split Pivot

- Farmer consideration: splitting pivot with different crops requiring water at different times—or very limited but timely irrigation to the 'complementary crop, e.g. sunflower or grain sorghum, to reduce total irrigated acres at one time
- Which crop has main emphasis?
  - Cotton production, give it all you can?
  - Corn—you signed a pounds contract?
  - Sunflower—widest range of planting dates

Sunflower Irrig. on Split Pivot

- Two-crop/two planting date/split pivot scenarios
  - Early cotton, late June/early July sunflower
  - Early sunflower, delayed cotton
  - Corn & Sunflower
  - Sunflower offers more flexibility than grain sorghum
- The goal is to minimize or even eliminate the overlap of peak irrigation
  - Much if not most of the time you are only watering a half circle
- Check with Extension (Trostle) for an explanation of possible scenarios for your farm

Shifts in Projected Dates

- A specific planting date for either cotton, corn, or sunflower does not mean cut-out or flowering will occur on a certain day or within a few days
- Heat unit accumulation drives physiological growth—it is potentially driven faster by heat

Shifts in Projected Dates

- Early cool fall temps. can greatly slow growth
- It is not worth sickly or slow emergence on cotton, corn, or sunflower if it means you need to wait 5 days while planting early
  - The potential damage in an early planting in cold conditions is a greater risk than if irrigation or heat during flowering hit crop later
  - If temperatures are reasonable is there a major cold front in the next 5-7 days?

Central/Lower TX South Plains

Early Cotton, Late Sunflower

- Half pivot with cotton, planted ~May 5
  - Peak water use early July to mid-August
  - Physiological cut out (5 NAWF) by ~August 10-15?
  - Significantly reduce irrigation ~Aug. 25 if soil moisture is available, Texas AgriLife data suggests much reduced irrigation benefit esp. if modest rain is received
- Sunflower @ 1,500 lbs./A yield goal,
  - "Schedule" flowering about September 10-15
  - Back up 55-60 days (from 9/10)—plant ~July 10

Central/Lower TX South Plains

Early Cotton, Late Sunflower

- Result: cotton is now at reduced moisture requirement and 3 weeks or more past cutout prior to sunflower bloom (~Sept. 10)
- Sunflower enters peak water demand 1-2 weeks after cotton cut out when cotton irrigation is significantly reduced
  - Sunflower maturity near October 15 (two weeks before average first freeze) with added potential of Sept. rainfall assisting yield
- Concentrate water to cotton early with 1-2 possible key waterings to sunflower prior to flowering (esp. buds ~0.5-1.0”)

Central/Lower TX South Plains

Early Sunflower, Delayed Cotton

- Half pivot with sunflower, planted ~April 15
  - Flower in ~60 days by June 15—peak water need lasts about two more weeks to ~July 1 (petal drop)
  - Maturity about July 20 & harvest begins in early August
  - This crop is essentially finished before cotton requires peak water in early July
- Cotton planting delayed to May 15th (or the last irrigated cotton you plant)
  - Physiological cut out ~Aug. 20-25th
  - Little overlap in peak irrigation needs
  - How strong is your water?

Parmer/Castro/Bailey/Lamb/Cochran

May 10 Cotton, Late Sunflower

- Easier to separate irrigation of the two crops vs. using grain sorghum in lieu of sunflower
- Half pivot cotton, planted ~May 10
  - Plant cotton earlier if you safely can due to soil temp.
  - Pair sunflower with your earliest cotton
  - Peak water use early July to mid-August, tapering off
  - Cut out (5 NAWF) about August 20-25th?—may not reach this stage most years
- Sunflower @ 1,500-2,000 lbs./A yield goal
  - "Schedule" flowering about September 5-10
  - Back up 55-60 days (from 9/5)—plant ~July 5

Parmer/Castro/Bailey/Lamb/Cochran

May 10 Cotton, Late Sunflower

- Result: cotton is about 2 weeks past cutout before sunflower blooming (~Sept. 5-10)
- Cotton "cutout" about the same time as peak sunflower water demand begins
  - Sunflower maturity near October 10 (this is close to early freezes) with potential of Sept. rainfall assisting yield
  - Some sunflower in this area planted up to July 20, but maturation faces frost/freeze; planting sunflower July 10 may be OK, but there could be a trade off between delaying irrigation need for sunflower (more water for cotton) vs. sunflower maturing in cooler conditions
- Concentrate water to cotton with ~2 key waterings to sunflower prior to initial bloom (esp. buds 0.5-1.0")

Parmer/Castro/Bailey/Lamb/Cochran

Early Sunflower & May 10 Cotton

- More separation in water use
- Half pivot with sunflower, planted ~April 20
  - Flower ~60 days by June 20—peak water need lasts about three more weeks to ~July 10 (petal drop)
  - Moderate and final sunflower water demand concludes by July 15 as long as some soil moisture remains
  - Sunflower nearly finished as cotton requires peak water in July
- Can't advocate delaying cotton
- Half pivot cotton, planted ~May 10
  - Peak water use early July to late August
  - Cutout (5 NAWF) about August 20-25th?

Potential Problem with Split Pivot Cotton & Sunflower?

- Sunflower is extremely sensitive to herbicide drift like Roundup, Ignite, etc.
- You have to be very careful

Parmer/Castro/Bailey/Lamb

Early Corn, Late Sunflower

- Half pivot 108- to 115-day relative maturity corn, planted ~April 15
  - Compare heat units requirements for specific hybrids
  - Peak water use ~V10 and especially from silking to past milk (through ~July 25); maintain good soil water to near ½ starch line
  - Don't cut the corn short…
- Sunflower @ 1,500-2,000 lbs./A yield goal,
  - "Schedule" flowering about September 5-10
  - Back up 55-60 days (from 9/5)—plant ~July 5
  - One pre-watering may be needed for sunflower to ensure germination and even emergence; without rain, possibly a second modest watering before corn is finished
  - Grain sorghum in this circumstance would require a medium-early planted by July 1

Parmer/Castro/Bailey/Lamb

Early Corn, Late Sunflower

- Result: half circle of corn is essentially fully irrigated, possibly only one watering needed over on sunflower before corn maturity
- Sunflower maturity near October 10 (this is close to early freezes) with potential of Sept. rainfall assisting yield
  - Some sunflower in this area planted up to July 20, but in this early corn/late sunflower scenario there is no real benefit of planting the sunflower later thus any early fall cold risk is avoided

Parmer/Castro/Bailey/Lamb

Early Sunflower vs. Delayed Corn

- More separation in water use
- Half pivot with sunflower, planted ~April 15
  - Flower ~60 days by June 15—peak water need lasts about three more weeks to ~July 7 (petal drop)
  - Moderate sunflower water demand concludes by July 10
  - Sunflower crop is finished well before significant corn irrigation requirement requires peak water beginning late July
- Half pivot corn to achieve black layer by Oct. 10
  - Can vary choice of corn relative maturity, but know that late planting corn needs extra days, good moisture profile, most of the irrigation
  - For 105-110-day relative maturity, plant by June 20 (silking, etc. after mid-August heat)
  - Minimal water needs (establishment irrigation only) and one additional irrigation needed before sunflower is finished

Moore/Sherman/Dallam/Hartley

Early Corn, Late Sunflower

- Half pivot 108- to 115-day relative maturity corn, planted ~April 20
  - Compare heat units requirements for specific corn hybrids
  - Peak water use begins ~V10 (June 5) and especially either side of silking (July 5) to past milk stage (and higher water requirement through ~July 30); maintain good soil water to near ½ starch line then corn maturity ~Aug. 10;
- Sunflower ~1,600 lbs./A yield goal (~6" irrigation)
  - "Schedule" flowering about September 1 (Dallam/Hartley) to Sept. 5
  - Back up ~60 days (from 9/1 to 9/5)—plant by ~July 1 (Dallam/Hartley) to July 5th (the suggested primary plant date cut-off in the northern Texas Panhandle)
  - By the time the growing point starts differentiating at ~30 days after planting and a timely irrigation is desired (~July 20th, ~110-day CRM corn is essentially done with irrigation
  - Remaining irrigation resources can be dedicated to sunflower, including highest water requirements in before/after initial bloom
  - Grain sorghum in same field would require a medium-early planted by no later June 25 (a little earlier is better for sorghum maturity)

Moore-Sherman Counties

Early Corn, Late Sunflower

- Result: half circle of corn is essentially fully irrigated; for sunflower—
  - One watering to establish stand (early July)
  - By about the time corn is finished, only then is sunflower coming in to significant water requirements (starting 30-40 days after planting), leading up to initial bloom
- Sunflower maturity by ~Oct. 10 (this is close to early freezes) with potential of late August & September rainfall assisting yield
  - Modest population for sunflower to better prepare the crop to wait until after corn irrigation is completed
- **This scenario works well.** Could tweak planting dates (later corn, earlier sunflower) or corn hybrid maturity if desired.

Moore/Sherman/Dallam/Hartley
Early Sunflower vs. Delayed Corn

- More separation in water use
- Half pivot with sunflower, planted ~April 20
  - Flower ~60 days by June 20—peak water need lasts about three more weeks to ~July 10 (petal drop)
  - If soil moisture is good then irrigation demand is probably over
  - Sunflower crop is finished well before significant corn irrigation requires peak water beginning mid July
- Half pivot corn to achieve black layer by Oct. 5
  - Can vary choice of corn relative maturity
  - For 105- to 110-day relative maturity, plant by ~June 15 (silking, etc. after worst of August heat)
  - Apply establishment irrigation for corn then significant water needs begin in mid July after sunflower is essentially finished, but ensure soil moisture profile for corn is full and don't short irrigation

Nitrogen Fertility

- #1 nutrient yield-limiting factor
- Promotes plant growth
- Promotes higher oils
- 5 lbs./N per 100 lbs. of yield goal
  - Some say 6 lbs./N per 100 lbs. of yield goal
  - 2,000 lbs. yield goal = 100 lbs. of total N
  - 3,000 lbs. yield goal = 150 lbs of total N
- No more than 10 lbs. of N by the seed

Nitrogen Fertility

- Sunflowers will scavenge for deep, leached N
  - Texas: fully credit all soil profile nitrate-N down to 36” to sunflower crop requirement
- What crop are you following?
- How much N did you put down on previous crop?
- How much N did that crop use?
- Mineralization (likely from organic matter)

Sunflower & Fertility

- Many West Texas growers neglect adequate sunflower fertility and fertilizer
- P and especially K not normally a problem unless soil test information alerts you
- For 100 lbs./A of yield:
  - 5-6 lbs. N/A, recent KS/CO tests suggest 6-7 lbs. N/A
  - 1.5 lbs. P_2O_5/A
  - 3.6 lbs. K_2O/A

TEXAS A&M AGRILIFE EXTENSION

E-619
10/12

http://agrilifebookstore.org

Nitrates in Irrigation Water: An Asset for Crop Production

Paul DeLaune (940) 552-9941 or pbdelaune@ag.tamu.edu
Calvin Trostle (806) 746-6101 or ctrostle@ag.tamu.edu

Naturally occurring nitrogen in the form of nitrate in irrigation water helps meet crop N requirements and reduces fertilizer cost for crop production. This nitrogen may be expressed as NO_3, NO_3-N, or nitrate-nitrogen—all actual nitrogen. This nitrogen is free and is readily available to the crop. It should be credited 100 percent toward crop needs if applied just before or during crop growth.

This N in irrigation water can:

- Supply varying amounts of timely N during the growing season;
- Be available to the crop immediately;
- Reduce the amount of N fertilizer the producer must buy;
- Be credited toward crop nitrogen needs as a sound economic and agronomic practice;
- Reduce excess nitrates from entering groundwater from percolation or runoff.

Nitrate content in Texas irrigation waters

Though some waters used for irrigation in Texas contain 20 to 50 ppm nitrate-N, most average 3 to 10 parts per million (ppm) nitrate-N (Fig. 1). Regions that tend to have irrigation water with higher nitrate-N include:

- South of San Antonio
- East of Midland-Odessa and north through most of the Texas South Plains

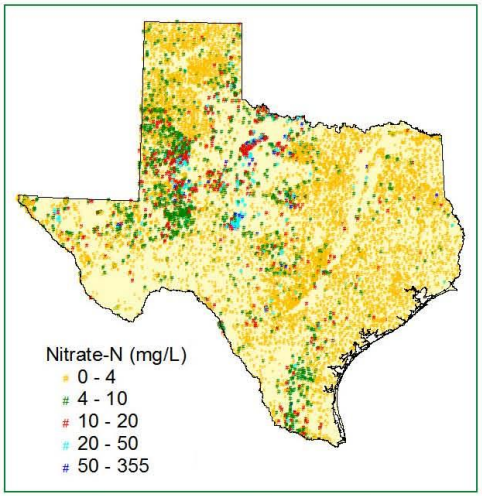


Figure 1. Distribution of NO_3-N in groundwater in Texas (Texas Water Development Board Data)

- Several areas in the Texas Rolling Plains aquifers, especially the Seymour Aquifer—the highest median nitrate-N among major aquifers in Texas

Federal Drinking Water Standards

The public health drinking water standard set by the U.S. Environmental Protection Agency is expressed as 10 ppm NO_3-N or 10 mg/ml NO_3-N. A person who endures prolonged consumption of

Environmental soil scientist, Texas A&M AgriLife Research (Vernon)

New from TX AgriLife

- Should NO_3-N in irrigation water be credited to crop requirement?
- Yes—fully!
- 7 ppm NO_3-N X 10" irrig. = 16 lbs. N/ac
- At $0.60/lb., then $9.60/acre
  - 0.3 bales of cotton
  - 800 lbs. of grain sorghum
  - 13 bushels of wheat
  - 300 lbs. of sunflower

The Irony of Sunflower

- Sunflower is often cussed for the very reason they can be highly successful

Poor Crop After Sunflower?

- Sunflowers remove moisture and nutrients deep in the root zone (as deep as 8')
- Favors early sunflower planting (by early May) to allow soil moisture recharge from late Aug.-Sept.-Oct. rains, averaging 4-5" in West Texas
- Fall small grains after sunflower is an iffy proposition

Poor Crop After Sunflower?

- Texas Panhandle—Subsequent corn yield maps showing ~30 bu/A reduced yield after sunflower vs. continuous corn

- Let's be honest: how well was that sunflower watered? how much fertility was applied?

Poor Crop After Sunflower?

- Many West Texas growers neglect adequate sunflower fertility
- They fail to consider deep moisture removal

Soil Testing after Sunflower

- Highly recommended, especially when sunflower fertility inputs were minimal
- Observation: many first-time growers use only 2-4 lbs. of N per 100 lbs. of yield goal
  - That's a low-input crop mentality, which often comes in a catch-crop situation when previous crops have failed

A Possible Concern

- Anyone promoting sunflowers as 'low input' and 'inexpensive' to grow
- The two places a producer then cuts inputs?
  - Nitrogen
  - Trying to save money on sunflower head moth spray (by not spraying!)

Easy Way to Ruin Sunflower

- In my experience this is the #1 problem in Texas sunflower production
- Stated a different way, the most likely stumbling block that turns a decent crop into something sub-optimal, and in worst cases, a failure

The "Boll Weevil of Sunflowers"—Sunflower Head Moth

Too many growers "never knew" about this insect before growing, or if they did they sprayed too late—It will lead to major crop damage if not controlled.

The moth you scout for—early dawn or nearly dark!

The larvae feeding which leads to fungal infection.

"Managing Insect Pests in Texas Sunflower," Dr. Ed Bynum, Texas AgriLife Extension—Amarillo (2009)

AgriLIFE EXTENSION
Texas A&M System

Managing Insect Pests of Texas Sunflowers

E-579
7-09

Ed Bynum
Extension Entomologist
The Texas A&M System

Insect pests are often a major limiting factor in Texas sunflower production. Of the 30 insect species recorded on sunflower in Texas, about 13 are considered potentially major pests. The sunflower moth is the major common pest of sunflower. Stem weevils, seed weevils, the stalk girdlers, and thistle caterpillar are of secondary importance, although they can be quite serious when abundant.

Both oilseed and non-oilseed (confectionary) sunflowers are grown in Texas. The small, black seeds of oilseed sunflower contain 38 to 50 percent oil. They are processed into sunflower oil and also used as bird feed. Confectionary sunflower seeds are usually large with black and white stripes. They are used for human consumption in a variety of food products.

Because the sunflower has a relatively short growing season, it is suitable primarily as a spring-planted crop or as a second crop after wheat. Sunflower can be an alternative crop where plantings of other crops have been destroyed by wind, sand, rain or hail. Drought tolerance makes sunflower an attractive dryland crop and an alternative in areas with limited irrigation. Sunflower also responds well under full irrigation.

Cultural practices that help reduce insect problems include crop rotation, modified planting dates, weed control, volunteer and wild sunflower control and tillage. However, the judicious use of insecticides is often required for successful sunflower production in Texas. Producers should be able to identify the insect pests that reduce sunflower yield and know when those pests are most likely to occur during the growth of the plant. They should also understand pest biology and the control measures that are most effective.

Figure 1. Sunflower moths (photo by Scott Russell).

Figure 2. Sunflower moths (photo by Scott Russell).

Insect pests infesting the head

Sunflower moth

Lepidoptera: Pyralidae, *Homoeosoma electellum* (Hulst)

The sunflower moth, also called the head moth, is the single most important sunflower pest in Texas. Sunflower moth infestations are usually heaviest early in the growing season, with another smaller moth flight possible later in the season. The adult is a small, slender, silver-to-buff gray moth about ½ inch long. It is most often seen resting on sunflower heads during the blooming period, especially in early morning and early evening.

Sunflower Head Moth

- Threat for 7-10 days beginning with initial bloom when pollen becomes available
  - Second spray when needed 5-7 days later (but not for low yields in dryland)
- Don't get caught!—Hybrids bloom fast, from 5% to 75% bloom in 2-3 days if warm
  - Don't wait until 2-5% bloom to contact your airplane; get on the spray schedule
- Uncontrolled larvae eventually burrow into head destroying seed—increasing susceptibility to *Rhizopus* head rot

Rapid Progression of Bloom

Hybrid	Planted	--- %	of Blo	om ---
		8/13	8/15	8/17
Triumph 845HO	6/26/07	0	5	68
Red River 2215	6/26/07	1	9	84
		7/11	7/13	7/15
Triumph 845HO	5/17/08	1	23	96
Red River 2215	5/17/08	0	10	74

Sunflower Head Moth Spraying

- "Managing Insect Pests of Texas Sunflower," Texas AgriLife Extension Service, E-579 (2009)
  - http://agrilifebookstore.org for view/print/download color copy
- Sunflower moth treatment strategies
  - Historical 'By the Book' suggestions
  - Current 'By the Book' suggestions
  - Industry recommendations & practices

Sunflower Head Moth Spraying

- Historically "By the Book" (1998 Texas Guide)
  - Spray at 1-2 moths per 5 heads @ 20-25% bloom—Count any head as blooming when any part of the flower is exposed)
  - Apply first pyrethroid (possibly with methyl parathion for added quick knock down) @ 20-25% of plants in bloom
  - Downside: No room for error; practice tolerated significant level of moths in the field; moths have 1-2 days to freely lay eggs
  - Result: Applications not timed right then producers more likely to have damage?

Sunflower Head Moth Spraying

- Current "By the Book" (Extension's insect guide)
  - Spray at 15-25% bloom 'when moths are in the field'; count any head as blooming when any of the ray flowers are opening and disk flowers are exposed.
  - No statement on how many moths (threshold is presence, not number)
  - Apply first pyrethroid (possibly with added methyl parathion for quick knock down)
  - Downside: Still no room for error; moths still have 1-2 days to freely lay eggs on many heads
  - Result: Still have potentially damage if late

Sunflower Head Moth Spraying

- Industry practices & recommendations #1
  - Spraying earlier (~5% bloom, i.e. 1-2 days earlier) & lower moth threshold—this minimizes mistakes, may provide better results, allows room for delayed spraying
  - Makes the spraying decision sooner (which allows more time to schedule spraying)
  - Downside: Could you spray too early? If you spray this early, would you lack coverage in 5-7 days, or be forced to spray a second time (esp. dryland)?
  - Result: No method is immune to failure, but industry widely believes this approach offers protection against common pitfalls (spraying too late, more time to act if it appears first spray was not effective), possible better control

Sunflower Head Moth Spraying

- Industry practices & recommendations #2
  - Spraying earlier and automatically (~5% bloom, i.e. 1-2 days earlier)
  - Makes the spraying decision sooner (which allows more time to schedule spraying)
  - Downside: Again, could you spray too early, and lack coverage later? Did you in fact need to spray, especially for late-planted sunflower (thereby an unnecessary expense)? It is wise to still know what level of moth was in the field (might influence decision on whether to spray a second time)
  - Result: No method is immune to failure, but at least you can't say you didn't spray.

Head Moth Spraying & IPM

- It is unthinkable to suggest we'd spray sunflower for head moth without scouting
- However, industry experience suggests (and Trostle concurs) that as a group we might be better off if we sprayed automatically because of the mistakes that can occur
- It is commonly thought "If you have head damage it means you sprayed too late"
  - This discounts that truly sometimes a spray doesn't work
  - Or the moth flight was late

New Insecticide, New Approach—Prevathon, 2013 I.

- Active ingredient, chlorantraniliprole (Rynaxypyr), from Dupont
- "Softer" chemical; does not affect honeybees and other beneficials
- See supplemental label for further information
- Ignore label's minimum 2 gallons water per acre, go with at least 3 gpa, preferably 4

New Insecticide, New Approach—Prevathon, 2013 II.

- "Translaminar" movement of insecticide to feeding larvae
  - Little to no activity on adults so scouting after your first spray doesn't mean much
- 10 to 14-day spray interval (though supplemental label says 7 days, use MSO additive)
  - Extension & Dupont agreement, December 2013: initial spray of 14 oz/A at 1% bloom and then 14 oz./A again in 7-10 days (a single initial 20 oz./A application may not be enough)

New Insecticide, New Approach—Prevathon, 2013 III.

- See the special label for Texas at http://www.cdms.net
- First spray earlier (initial bloom) than pyrethroid alone (5-20% bloom)
- Initial data compared to pyrethroid, which kills beneficials, demonstrates lower larval counts in the head for Prevathon
- First impression from Texas A&M AgriLife Extension entomologists: results are good, mixed thoughts on excluding pyrethroid until more data is collected
  - Besiege, from Syngenta, is a mix of Rynaypyr (different formulation) and pyrethroid

New Insecticide, New Approach—Besiege, 2013

- Syngenta—mix of chlorantraniliprole and pyrethroid (Lambda-cyhalothrin), 6-10 oz/A
- See the special label for sunflower at http://www.cdms.net
- First spray "before pests reach damaging levels"
- Chlorotraniliprole in Prevathon: 10 oz./A rate of Prevathon = 7.6 oz/A for Besiege
  - A 14 oz./A rate of chlorotrniliprole would be 10.6 oz./A of Besiege, which is a little high
  - This rate of Besiege @ 7.6 oz./A includes 1.54 oz/A of Warrior II/L-cyhalothrin (labeled range for sunflower, 1.28-1.92 oz./A)

New Insecticide, New Approach—Belt (Bayer), 2013

- First spray same time as pyrethroid
- Like Prevathon, this does not kill adults either, but kills young feeding larvae; does not have movement within the plant
- Ignore label's minimum 2 gallons water per acre, go with at least 3 gpa, preferably 4
- First impression from Texas A&M AgriLife Extension entomologists: results are good, mixed thoughts on excluding pyrethroid until more data is collected
  - Limited data suggests good control, reduction in feeding larvae

Bottom Line—Head Moth

- Whatever approach you choose:

1) Do your best to achieve uniform emergence, hence uniform bloom
2) Two weeks prior to probable spray, get a commitment from applicator and make sure chemicals are on hand
3) Do scout at first bloom anywhere in the field (if you are a first-time grower, get help)
4) Aerial spray—minimum 3 gal/A, hopefully a little more
5) Follow-up scouting a 2-4 days after first spray to ensure you get kill (most important!)

Frank Discussion on Head Moth Spray Timing (Calvin Trostle)

- Personally, I think AgriLife recommendations for pyrethroids in and of themselves are OK, but leave little margin for error; you must scout early and be prepared to spray; if you are ready then YOU CAN GET IT DONE AT THE RIGHT TIME (THE NEXT DAY?) and get good control.
- But too many farmers don't take time to scout and spray in time
- Although this violates what we know and believe about Integrated Pest Management (IPM), collectively as a group farmers would be better off if we just sprayed automatically even if only a few scattered moths are observed.
- Scouting during the heat of the day is not reliable for moth populations between few and moderate. They hide on the leaves rather than up on the heads as during pre-dawn and late dusk.

Upper left, R-3, will soon reveal back side of ray petals (above, R-4), then with ray petals open the next day (left, R-5.1) will begin physiological bloom around the edge of the face.

This picture sequence is about 7-9 days.

Sunflower Bloom Stages

Texas Agricultural Extension Service
Calvin Trostle / Patrick Porter

Calvin Trostle/Pat Porter, Texas A&M AgriLife Extension Service

Head Moth Larval Damage

Web-based video discussing timing of sunflower head moth spray vs. bloom stage.

http://lubbock.tamu.edu
Pat Porter/Calvin Trostle
Texas A&M AgriLife Extension Service

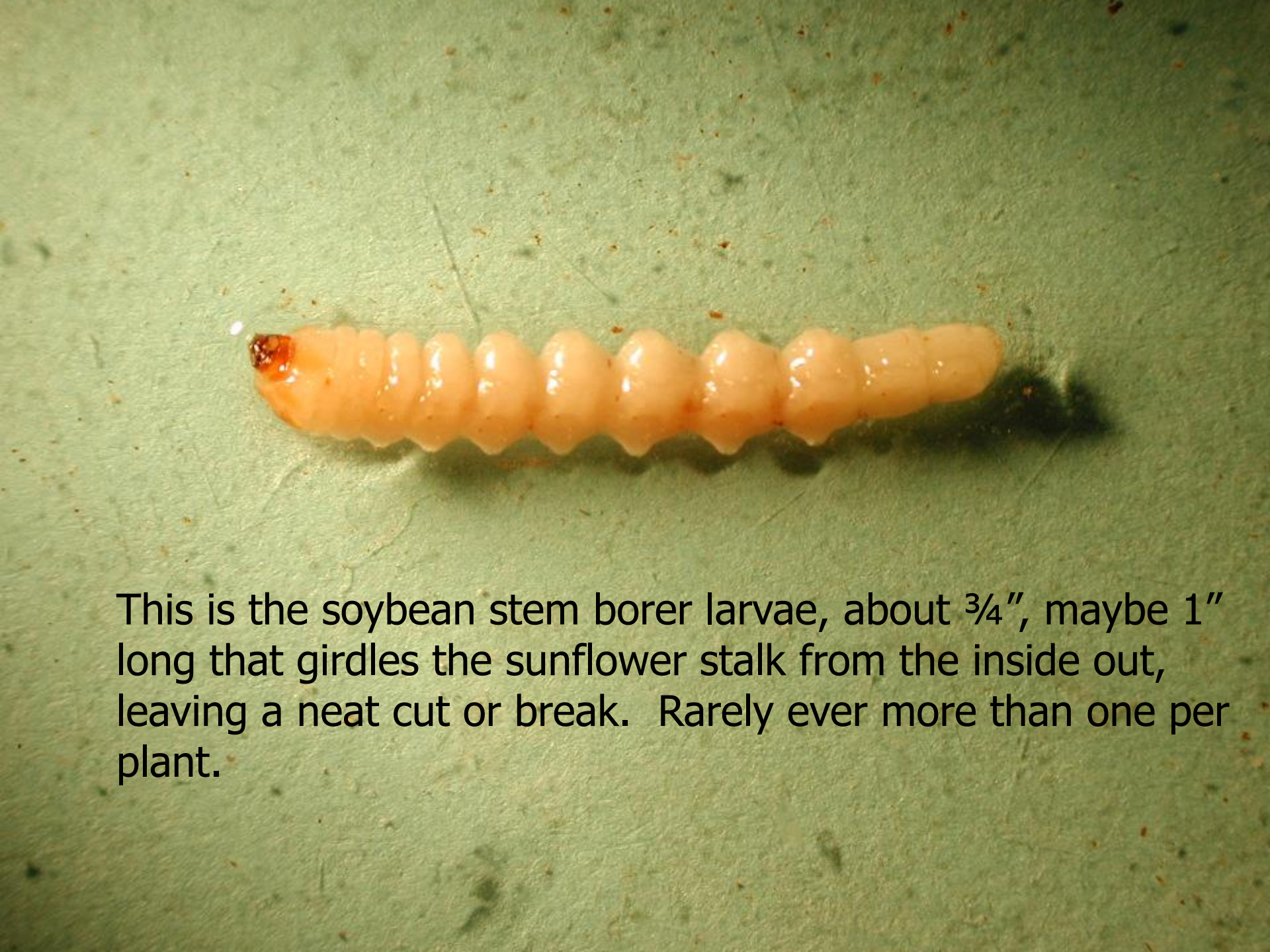
Other Insects in TX Sunflower

- "Managing Insect Pests in Texas Sunflower," Dr. Ed Bynum, Texas AgriLife Extension—Amarillo (2009)
- Stem weevil
- Soybean stem borer in sunflower (*Dectes texanus Leconte*); adult is Longhorn beetle; also known as sunflower stem borer or sunflower stalk girdler

Stem Borer (*D. texanus*)

- Occasional high incidence (e.g., 2001); often not noticed until plants lodge
- Egg laying near petioles, single larvae burrows in pith, often found late in season in base of plant
- Girdles plant at soil line from inside out; backfills bore hole with plant fibers, frass

Adult Long-horn beetle
(*Dectes texanus*)



This is the soybean stem borer larvae, about ¾”, maybe 1” long that girdles the sunflower stalk from the inside out, leaving a neat cut or break. Rarely ever more than one per plant.

Stem Borer (*D. texanus*)

- No pheromone traps, hard to scout, no control recommendations at this time
- Incidence appears higher near/after soybeans
  - Also, don't plant sunflower after sunflower (or soybean after sunflower)
- Observations suggest lodging potential increases with higher plant populations
- Be ready to harvest

Stem Weevil

- Diverse observations on this being a problem
  - National Sunflower Association annual surveys haven't shown much activity
  - Seed company production finds this to be a common problem
- Furadan no longer available for control
- Seed treatments are not effective
- SW larval rates drop significantly after mid June planting dates – (Carl Patrick, retired AgriLife Extension entomologist)

Common Weeds in Sunflower Grower Comments

- Carelessweed/pigweed/Palmer ameranth
- Johnsongrass
- Barnyardgrass
- Perennials such as Texas blueweed, silverleaf nightshade (whiteweed), woolly leaf bursage (lakeweed)
- Rotations, especially with Roundup Ready crops may factor in to decisions

Major Herbicide Labels

- Pre-plant
  - Dual Magnum (s-metolachlor)
  - Prowl & Prowl H2O (pendimethalin)
  - Sonalan & Treflan (trifluralin)—"yellows"
  - Spartan (sulfentrazone—18 month rotation to cotton)
  - BroadAxe (Dual + Spartan)
- Post-emerge
  - Clethodim, quizalofop: Grass control with Poast Plus, Select Max, Targa, Assure
  - "Clearfield" & "Clearfield Plus" sunflower (IMI tolerant) using Beyond (same active ingredient as Raptor), $$ for herbicide
  - Dupont Express—SU herbicide for Pioneer & other ExpressSun hybrids

Texas A&M AgriLife Weed Control Expertise for Sunflower

- High Plains
  - Extension's Peter Dotray, Lubbock
- Central Texas
  - Paul Baumann, College Station
- Texas Gulf Coast
  - James Grichar, Yoakum/Beeville
- What cotton, corn, grain sorghum herbicides preclude cotton the next year? Or in a hail-out situation?

If You Plan to Grow Sunflower in Cotton Country…

- Sunflower is extremely sensitive to glyphosate
- Neighbors need to know, pilots need be cautioned, document damage from drift if it occurs

Birds and Sunflowers

- Can wreck a crop, especially near town or other area with many trees, or areas with a permanent water supply
- Be ready to harvest at maturity
- Bird repellants, boom guns, etc. rarely work for very long if at all

Volunteer Sunflower

- Leave residue on surface to let birds clean up the seed
- Can terminate volunteer early, germination (~50°F) will start germinating volunteer sunflower
- Round-Up ready and Liberty Link crops offer good control

Harvest Timing

- Maturity when back of heads are lemon yellow and bracts are turning brown (<35% seed moisture)
- Seed moisture can be low even when heads have some moisture--seed loses 1% per day with heat and low humidity
  - Target 8-10% seed moisture (unless you can dry seed then harvest up to ~14%); don't hesitate to take a test cutting sooner than you think as sunflowers may be ready; get the head through the combine in one piece; dry sunflower is very trashy.
  - Some late-season producers consider Roundup, paraquat, or sodium chlorate to dry the heads
  - For the High Plains this might be more an issue for late-planted sunflower (early July) when fall rains or cool weather prevail

Harvest Header Equipment

- Platform header with “pans” probably most common
- Specialized sunflower crop headers (several types marketed in the Dakotas & Kansas)
- All-crop or soybean header (this might work especially well with short-stature sunflower)
- Corn header with knives

Harvest Tips for Sunflower

- Don't shut the wind down too much or you will have "pops", e.g. seed with no meat—a bigger concern for confectionary
- Thresh heads through combine in one piece
- Combine Adjustments
  - Cylinder: 300 to 500 RPM;
  - Concave: 1" front, 3/4" rear; Sieve: 1/2" to 5/8" top, 3/8" bottom

Harvest

- Desiccants
  - Can speed harvest; combine 5-7 days after application
  - Probably not cost effective for April to late-May planted Texas South Plains fields as hot conditions prevail during drydown
  - Some Panhandle growers prefer desiccants for later planted sunflowers
  - Custom harvesters comment they like the harvest conditions of treated sunflowers

Harvesting

- **Headers**
  - "Pans" (reel removed) or all crop head

Moisture Levels at Harvest

- **10% or more**
  - Minimal trash
  - Minimal seed damage
  - Minimal dockage
- **8% or less**
  - Pulverized heads
  - Lots of trash in bin
  - Seed shattering
  - Harvest losses
  - Fires

Harvesting

- **If moisture below 8%**
  - Harvest at night
  - Keep water truck handy

Texas Sunflower-- Profitability 'Keys'

- Obtaining uniform emergence to aid yields & simplify control of sunflower head moth
- Absolute commitment to scouting and early spraying for sunflower head moth
- If irrigated, timely irrigation (bud stage, flower),
- Early plantings may yield higher; harvest as soon as possible

Sunflower--Mistakes

- Taking the attitude that sunflower is a low input crop
- Improper or inadequate scouting and control measures for sunflower head moth
- Too high plant populations (smaller, less valuable seed) in confectionary
- Not fertilizing enough (e.g. 5-6 lbs. N per 100 lbs. of yield goal)

Sunflower Web Info. for TX

- http://lubbock.tamu.edu/sunflower
- In late 2014, look for http://sunflower.tamu.edu
- Kansas-Colorado sunflower guide has much basic info:
  - http://www.ksre.ksu.edu/bookstore/pubs/MF2384.pdf
- Also, National Sunflower Association has excellent resources, including lists of labeled fungicides, insecticides, and herbicides
  - http://www.sunflowernsa.com

Time for a Break!!