TEXAS A&M AGRILIFE EXTENSION

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Sunflower in Central & Northeast Texas

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NE Texas: Recent Production

- ~12,000 acres?
- Primarily Lamar & Fannin Counties; also Delta, Hunt, Grayson
- Sunflower most likely replacing soybeans in Lamar Co.
- Future oilseed market in in Oklahoma City
- Confectionary market depends on buyer, but "delivered" locally then hauled

Recent Production

- Oilseed: $24-25/cwt. with a 2-for-1 oil premium based at 40% (toward upper end of historic prices)
- Confectionary: less likely, $36/23 per cwt. according to seed size (premium for large size seed; high end of historic prices)

Sunflower Production in Pictures

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


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And Ultimately *Rhizopus* Headrot

"Styrofoam Bricks!"

Are these pictures worrisome?

- Don't let them be—just be informed
- The good news is that the sunflower 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

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?

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 trials from TX AgriLife gave 48, 57, & 75% large seed.
TX High Plains research notes reduced seeding rates significantly increase large seed

Markets & Pricing, 2013 (Ex.)

Acre Contracts

- **Oilseed--**Dark seeded
  - Three oil types: "NuSun" mid-oleic fatty acid is most common; High oleic (HO); Traditional (little demand)
- NuSun & HO make good biodiesel, but they are worth much more in food market
- ~$25/cwt in Central Texas with 2:1 premium/ discount for oil contents above/below 40%
  - California Oils will consider Central Texas acreage, 806-928-7655 (Damon Ferguson, Canyon)
  - Producers Co-op Oil Mill, Oklahoma City, www.producerscoop.net, may consider oilseed contracts in the future
  - Some birdfood market potential (no oil check)

Grade Evaluation at Harvest

- Oilseed—Oil content
- Confectionary—Seed size
  - Ensure that "pops," which are unfilled hulls, and other trash is left in the field

Common Growers' Mistakes with Sunflower

- Hoping for a home run on a "low-input crop", that is, being unrealistic
- High percentage of first-time sunflower growers may have negative experience—Why?
  - Skimped on inputs especially insect spray for sunflower head moth
  - Applied little or no N fertilizer
  - No prior arrangements for timely harvest with necessary header equipment

Prospective Grower's Perception of Sunflower

- In TX High Plains, higher % of first-time sunflower growers have negative experience more than any other field crop
  - Central & Northeast Texas: be aware of other producers' experience and why
- Some past growers say, "Yeah, I grew sunflowers once, and I'll never do that again…"
- Why? We need to know.
  - What will Central & North Texas growers say 5 years from now?

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

Oilseed Characteristics

- **Oil Hybrids**—40% oil is standard
  - Premiums paid for > 40% (usually 2-for-1)
  - Discounted for < 40%
    - Factors that seem to contribute to lower oil contents are a) late planting which may not have time to mature, b) hot dry conditions, more likely to affect dryland, c) some hybrids do not have as much oil content
  - Typical range 38-45% in Texas
  - Example (2012): $28.00/cwt and a sunflower field achieves 41% oil yields pay rate of $28.56/cwt.
    - Each 1% of oil is premium/discount of $0.36/cwt.
  - Birdfood oil sunflower will not check for oil content
  - Test Wt.--Typically range from 28-32 lbs./bu for oils

Hybrid Seed Choices

- Herbicide IMI-tolerant (Clearfield, Clearfield Plus) available for oilseeds and now confectionary
- ExpressSun SU tolerant also in oilseeds
- Rust tolerance available among several hybrids (should help in humid environment of Central Texas)
- Downy mildew resistant not an issue in Texas

Plant Population

- Think in terms of seed drop per acre, especially for confectionary, where yield of large seed is worth almost twice as much
- Narrower row spacing favors higher yield

Seed Rate & Controlling Risk

- 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
- Lower populations yield well and help manage dry conditions when they occur

Planting: Central/NE Texas

- Confectionary, ~14,000-18,000 seeds/acre
- Oilseed, ~20,000-23,000 seeds/acre
- These are reasonable targets until research may update these numbers
- Use air-vacuum planter for even spacing—
  - Lease this planter, or have a neighbor plant it for you; avoid plate planters.
- Plant north-south so heads tip into empty row?

Planting—Northeast Texas

- Earliest planting about mid- to late- March with average daily minimum soil temperatures ~50 F extending to mid-late July
  - There is no heat or maturity limitation to planting sunflower up to mid-or late July in Northeast or Central Texas, but productivity (summer heat, possible drought effects?) or harvestability (poor fall drying conditions due to rain, humidity?) are largely unknown
  - However, until Texas A&M AgriLife has further information, it appears that a practical cut-off for planting sunflower is early to mid-May
  - Growers with several sunflower crops now believe their best crops are planted earlier in this window of early March to early May (practical cutoff probably early May)
  - About as early as you'd plant corn

Planting—Northeast Texas

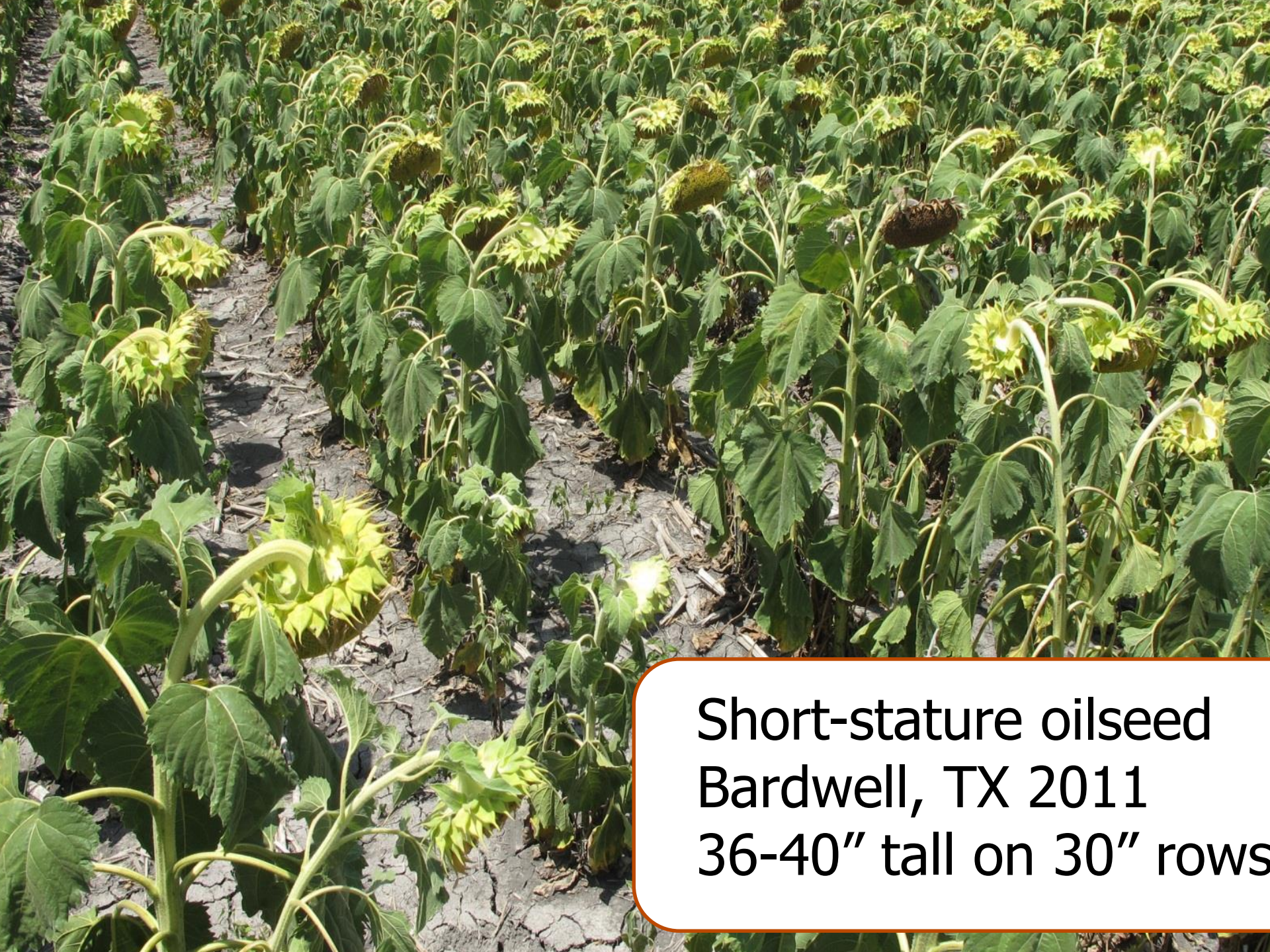
- Seed drop--Think in terms of seed drop per acre, especially for confectionary, where yield of large seed is worth almost twice as much
- Regional growers suggest that emergence and stand establishment will be better if significant tillage is avoided prior to planting (better success in stale seedbed)

Central & Northeast TX Planting Dates

- Minimum average daily soil temperature of 50 F required (similar to corn)
- Don't plant more than 2 weeks before last average spring freeze date to ensure adequate germination conditions
  - Last average freeze (30-year average, Texas Almanac, 2008-2009): Fannin, 3/21; Lamar, 3/18; Delta & Hunt, 3/23
  - Ellis Co., last average freeze, 3/14
  - Milam Co., last average freeze, 3/7

Last Recommended Planting, Central & Northeast Texas?

- We are uncertain about this, but here's an estimate from a High Plains sunflower worker!
  - Minimize risk of reduced oil content (Oilseed) or small seed (Confectionary)
  - Typical hybrids in some years grow slower in Central Texas and >120 days to maturity, but in other years 2 and even 3 weeks less
  - Need to be conservative to ensure harvestable yield
  - July 20?—there's plenty of heat, but I suspect yields will tail off. Will gladly defer to local recs., but practical cut-off probably early to mid-May.


Short-stature oilseed
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).

Sunflower & Fertility

- Too many sunflower growers neglect adequate fertility
- K not normally a problem unless soil test information warns you; P often needed
- For 100 lbs./A of yield:
  - 5-6 lbs. N/A
  - 1.5 lbs. P_2O_5/A
  - 3.6 lbs. K_2O/A
  - Micros rarely deficient

Nitrogen Fertility

- Sunflowers will scavenge for deep, leached N
- 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)

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 (down to 8')
- Favors early sunflower planting (~by April) to allow soil moisture recharge
  - Fall-winter rains in Northeast Texas normally more than enough to replenish to full profile
- Fall small grains after sunflower is an iffy proposition until agronomy identifies the reasons for reduced wheat yield.

Major Herbicide Labels

- What weeds can you manage with:
- Pre-plant/pre-emerge
- Dual Magnum (s-metolachlor)
- Prowl (pendimethalin)
- Sonalan & Trifluralin (Treflan)
- Spartan (no cotton next year)
  - Be cautious about higher rates on sandy soils
- BroadAxe (sulfentrazone & s-metolachlor), new label in 2012
  - Research in SD, ND, KS suggests these are better together than applied separately

Major Herbicide Labels

- What weeds can you manage with:
- Post-emerge
- Grass control with Poast Plus, Select 2EC, Assure II/Targa
- "Clearfield" sunflower (IMI tolerant) using Beyond (same active ingredient as Raptor);
  - now moving to "Clearfield Plus", which uses stronger additives, COC or MSO (but Beyond rate is the same
  - Do not use COC or MSO on regular Clearfield
- "ExpressSun" sunflower (sulfonyl urea tolerant) uses Express herbicide (tribenuron methyl);
  - longer window of application, potentially up to 35 days (estimate—"before bud initiation," but only a few oilseed hybrid choices from Pioneer, Seeds2000, Croplan)

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.

Insects in Texas Sunflower

- Sunflower (head) moth
- Stem weevil
- Soybean stem borer in sunflower (*Dectes texanus Leconte*); adult is Longhorn beetle; also known as sunflower stem borer or sunflower stalk girdler (we don't recommend planting sunflower after soybeans)

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"
  - Spray at 1-2 moths per 5 heads @ 20% bloom
  - 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: 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'
  - 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), even 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 anathema 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

New Insecticide, New Approach—Prevathon, 2013

- Active ingredient, chlorantraniliprole (Rynaxypyr), from Dupont
- "Softer" chemical; does not affect honeybees and other beneficials
- See supplement for further information
- "Translaminar" movement of insecticide to feeding larvae
  - Little to no activity on adults
- Up to 14-day spray interval
  - Extension & Dupont agreement for 2014: initial spray of 14 oz/A at 1% bloom and 14 oz./A then again in 7-10 days (initial 20 oz/A only may not be enough)

More from Prevathon Label

- For best results apply when moth populations reach local established treatment thresholds and as blooms begin to open (sunflower growth stage R-5.0 to R-5.1) to prevent crop damage.
- Problem with label (Trostle): minimum 2.0 gallons/A water for aerial application (low); 10 gallons/A by ground.

New Insecticide, New Approach—Prevathon, 2013

- See the special label for Texas at http://www.cdms.net
- First spray same time as pyrethroid (possibly earlier)
- Initial data compared to pyrethroid, which kills beneficials, suggest lower larval counts in the head for Prevathon in several tests
- First impression from Texas A&M AgriLife Extension entomologists: results are good, but questions about mixing with pyrethroid (which kills beneficials)
  - Besiege, from Syngenta, though is a mix of Rynaxypyr 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: 10 oz/A rate of Prevathon = 7.6 oz/A for Besiege
  - Also = 1.54 oz/A of Warrior II/L-cyhalothrin (labeled range 1.28-1.92 oz./A)
- Fi

Another Newer Label—Belt

- Bayer—active ingredient is flubendiamide
- AgriLife tests on several crops and insects suggest good control, including sunflower (observational)
- 2.0-4.0 oz/A
- Timing of first spray not clear

- Problem with label (Trostle): 2.0 gallons/A water for aerial application (low)

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, ideally a little more (up to 5 gal/A)
5) Follow-up scouting a couple days after first spray to ensure you get kill (most important!)

Frank Discussion on Head Moth Spray Timing (Calvin Trostle)

- Personally, I think the AgriLife recommendations in and of themselves are OK, but leave little margin for error, that is, if you need to spray for head moth AND YOU ACTUALLY GET IT DONE AT THE RIGHT TIME (THE NEXT DAY?) then you are probably OK.
- But too many farmers don't spray in time
- Although this violates what we know and believe about Integrated Pest Management (IPM), for sunflower head moth 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.

Sunflower Moth Spraying

- Industry experience--
  - Lower threshold, even a few moths in field
  - Initial spray earlier (~5-10% bloom)-- controls more adults and reduces egg lay
  - Use higher gallonage per acre (minimum 3 gpa) for better coverage
- Don’t get caught!--Newer hybrids bloom fast, e.g. 5% to 67% bloom in 3 days if hot; get on the spray schedule

Sunflower Bloom Stages

Early R-4

Late R-4

R-5.1
(10% of disk
flowers in bloom)

R-5.2
(20% of disk
flowers in bloom)

Texas Agricultural Extension Service
Calvin Trostle / Patrick Porter

Calvin Trostle/Pat Porter, Texas Cooperative Extension

Head Moth Larval Damage

Sunflower Head Moth

- A threat for 7-10 days beginning with initial bloom when pollen becomes available
- Uncontrolled larvae eventually burrow into head destroying seed--increasing susceptibility to *Rhizopus* head rot
- Best scouted in early morning or after sunset

Sunflower Moth Spraying

- "Managing Insect Pest of Texas Sunflower," Texas AgriLife Extension Service E-579 (2009)
  - http://agrilifebookstore.org for view/print/download of color copies
- For regional assistance in sunflower head moth spraying & other insect questions in sunflower, contact TX AgriLife Extension IPM agents:
  - Marty Jungman, Hill-McLennan Cos., 254.582.4022, mjungman@ag.tamu.edu
  - Jim Swart, Hunt-Lamar Cos., 903.886.5363, james_swart@tamu-commerce.edu

Stem Borer (*D. texanus*)

- High incidence observed in occasional years; 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

Harvest Timing

- Physiological maturity when back of heads are lemon yellow and bracts are yellow/brown/black
- Seed moisture can be low even when heads have some moisture--seeds loses >1% per day with heat and low humidity
- Don't hesitate to try a test cutting sooner than you think sunflowers are ready

Harvest Timing

- Maturity when back of heads are lemon yellow and bracts are yellow/brown/black
  - Target 8-10% seed moisture; don't hesitate to take a test cutting
  - Some late-season producers consider Roundup, paraquat, or sodium chlorate to dry the heads, to hasten harvest and/or minimize lodging potential

Harvest

- Desiccants—increasingly common use
  - Can speed harvest; combine 5-7 days after application
  - May not be cost effective for April to late-May planted Texas South Plains fields as hot conditions prevail during drydown
  - Some Texas growers prefer desiccants for later planted sunflowers
  - For recent summary on sunflower desiccation (and late-season weed control), see http://lubbock.tamu.edu/focus, Sept. 18, 2009 edition
- Combine Adjustments
  - Cylinder: 300 to 500 RPM; Concave: 1” front, .75” rear; Sieve: ½” to 5/8” top, 3/8” bottom

Harvesting

- **Headers**
  - Pans or all crop head

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 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 (rooting to 6-8')
  - Inadequate fertility (<5-6 lbs./N per 100 lbs. of production)
- Volunteer sunflower next year

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)

Texas Sunflower Web Info

- http://lubbock.tamu.edu/sunflower
  - Including herbicide guide, 'Common Concerns' production tips, hybrid trial results (High Plains), etc.
  - Forthcoming http://sunflower.tamu.edu, late winter 2014
- http://varietytesting.tamu.edu for sunflower hybrid trial results across Texas
- Also, National Sunflower Association has excellent resources, including lists of labeled fungicides, insecticides, and herbicides
  - http://www.sunflowernsa.com