

Insecticide Effectiveness for Texas-Kansas Sunflower Moth Control



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Sunflower (Head) Moth



- ⌘ Threat for 7-10 days (if uniform stand) 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 applicator; get on the spray schedule
- ⌘ Uncontrolled larvae eventually burrow into head destroying seed—increasing susceptibility to *Rhizopus* head rot



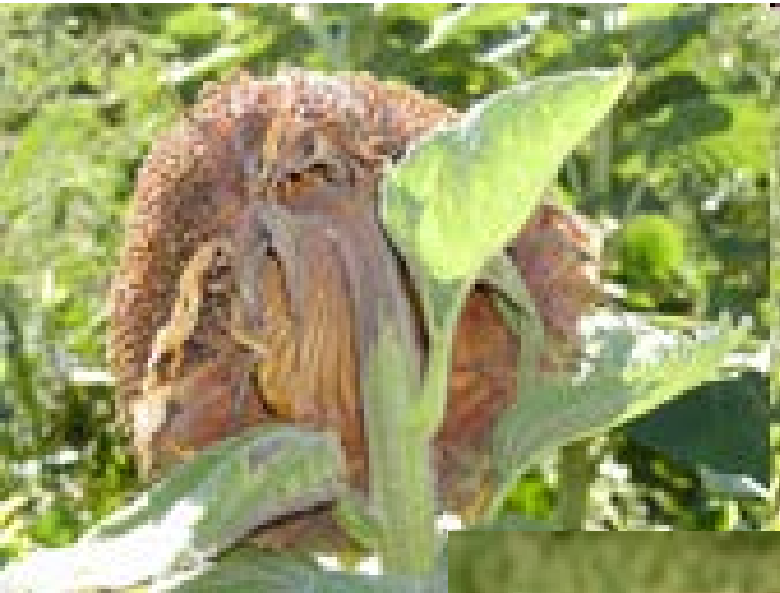


Sunflower Moth Larval Damage



This is especially detrimental to confectionary.

And Ultimately *Rhizopus* Headrot



“Styrofoam
Bricks!”



Upper left: Pre-R4, no ray petals showing yet on face.

Upper right: Mid R4, bracts pulled back, ray petals visible.



Sunflower Early Bloom Stages

Lower left: R5.0, some ray petals now erect and part of face exposed. One floret (disk flower) in bloom just above thumb tip.

Lower right: R5.1, disk flowers in bloom all around outer edge, about 10% of total area of the face of the sunflower.



Example of SFM Larval Abundance (no spraying, Texas sites)

	Mean Number of SFM Larvae/6 Heads			
Days After 1st Bloom	Field 1	Field 2	Field 3	Field 4
3	0	2	1	0
6	3	0	3	9
9	7	27	2	77
12	38	15	4	220
15	34	28	3	263
18	28	18	3	312
21	13	24	7	215
24	8	23	47	142
27	4	12	71	77
30	---	12	75	---
33	---	13	---	---

Sunflower Moth Spraying

⌘ Historically "By the Book" – 1998 Texas Guide

- ☒ Spray @ 20% - 25% bloom when any moths are found in the field – 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: Have to be scouting early, 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 are likely to have damage?

Sunflower Moth Spraying

⌘ Current "By the Book" (Texas AgriLife Extension's sunflower 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.
- ☒ Based on pyrethroids
- ☒ No statement on how many moths—threshold is presence, not number
- ☒ Downside: Still no room for error; moths still have 1-2 days to freely lay eggs on many heads
- ☒ Result: Still have potential damage if late

Sunflower Moth Spraying & IPM




- ⌘ Is it unthinkable to suggest we'd spray sunflower for sunflower moth without scouting
- ⌘ However, industry experience suggests 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

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
- ⌘ Up to 14-day spray interval (consider MSO additive)

2013 New Insecticide, New Approach—Prevathon



- ⌘ Earlier first spray (initial bloom) than pyrethroid alone (5-20% bloom)
- ⌘ Initial data compared to pyrethroid, which kills beneficials, demonstrates lower head larval counts
- ⌘ First impression from Texas A&M AgriLife entomologists: good results, mixed thoughts on excluding pyrethroid until more data is collected
 - 📦 **Besiege**, from Syngenta, is a mix of chlorantraniliprole and pyrethroid

Prevathon Label & Sunflower



- ⌘ Banded Moth, Sunflower Moth: “Apply when moth populations reach local established treatment thresholds and as blooms begin to open (R5.0-R5.1) to prevent crop damage.
- ⌘ Applications may be required at 5-7 day intervals when moth pressure is heavy.
- ⌘ Minimum 2 gal/A by air, 10 gal/A by ground rig.

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”
- ⌘ Chlorantraniliprole in Prevathon: 14 oz./A rate of Prevathon = 7.6 oz/A for Besiege
 - ⊞ A 14 oz./A rate of chlorantraniliprole would be 10.6 oz./A of Besiege, which is high
 - ⊞ This rate of Besiege @ 7.6 oz./A includes 1.54 oz/A of Warrior II/λ-cyhalothrin (labeled range for sunflower, 1.28-1.92 oz./A)

Besiege Label & Sunflower



- ⌘ Apply before pests reach damaging levels. Scout and treat again if populations rebuild to potentially damaging levels.
- ⌘ Minimum interval 5 days.
- ⌘ Minimum 5 gal/A by air, 10 gal/A by ground rig. Do not apply as an ultra-low volume spray.

Sunflower 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 chemical residue 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 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 chemical residue 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.



Hybrid trial with bloom ranging from 0% (upper right) to 20-25% (center back). Using (latest R-4/initial R-5.0) bloom, the field is >5% in bloom as a whole.

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—Sunflower 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 from 3 - 4 days after first spray to ensure you get kill to know if moths are still present

Individual Head Bloom vs. Field Bloom



- ⌘ The previous slides describe the opening of the sunflower head to expose the true (disk) flowers and the initiation of physiological bloom. This is the bloom for an individual head.
- ⌘ Field Bloom is determined differently. In this case it is a measure of **ALL** sunflower heads that are in any stage of physiological bloom, regardless of the degree of bloom an individual head is in. All blooming heads are counted equally toward Field Bloom whether just at initial bloom (R5.0), late bloom (R5.9), or even completed bloom.
- ⌘ For timing of sunflower (head) moth sprays use Field Bloom to gauge decisions about your initial application.

Objectives & Locations



- ⌘ Examine timing of Prevathon, Besiege, Belt, Warrior II applications
- ⌘ Examine early spray only vs. two-spray program
- ⌘ Lower Rio Grande Valley, Lubbock, Amarillo, Texas & Goodland, Kansas
- ⌘ Larval counts, yield, *Rhizopus* infection

2016 Trials	Rate	Rate	Target First	Target Second
Brand	First	Second	Application	Appl. Days
<u>Chemical</u>	<u>Spray</u>	<u>Spray</u>	<u>Growth Stage†</u>	<u>after R5.1-5.2</u>
Control	0	0	.---	.---
Prevathon	14	14	2 days before R5.0	4 (8 days after initial spray)
Prevathon	14	0	R5.1-5.2	None
Prevathon	14	14	R5.1-5.2	8
Besiege	7.6	7.6	2 days before R5.0	4 (8 days after initial spray)
Besiege	7.6	0	R5.1-5.2	None
Besiege	7.6	7.6	R5.1-5.2	8
Belt	3.0	0	R5.1-5.2	None
Belt	3.0	3.0	R5.1-5.2	8
Warrior II	1.92	0	R5.1-5.2	None
Warrior II	1.92	1.92	R5.1-5.2	8



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2016 Results—Texas



⌘ Lower Rio Grande Valley

☒ Mixed results, but higher larval counts with all pre-bloom treatments. Belt is poor on control.

⌘ Lubbock: SFM larval counts due to insecticide or timing, $P = 0.0596$; yields no difference, but we notice numerically higher control & Prevathon larval counts.

⌘ Amarillo: Trials planted twice but poor stand

2016 Results—Kansas



- ⌘ SFM larval & Seed Weevil counts due to insecticide or timing, $P \sim 0.10$ in both cases
- ⌘ Significant yield differences but no apparent relation to chemical treatments or timing
- ⌘ No significant difference in *Rhizopus* infection rates
- ⌘ Moth pressure was low

Summary on Early Prevathon (& Besiege) Applications



- ⌘ Preliminary data suggests no improvement in control... and some early Prevathon (2016; also preliminary data in 2014-2015)
- ⌘ Can you apply too early?—Yes
- ⌘ We often say for pyrethroids, “if in doubt, go ahead and spray” (be early rather than be late)
- ⌘ This is still probably sound advice for Prevathon (and Besiege?)
- ⌘ Dupont in Texas are pushing early application, and in fact have even suggested *three(!)* applications.

Ongoing Advice to Farmers

Subject to Additional Results



⌘ For sunflower moth control, which chemical you use may be your third most important consideration

⌘ Timing is first!

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⌘ **What is second?** COVERAGE! Recommended carrier volumes:

☒ 10 gal/A with ground rig

☒ At least 3 gal/A by air (preferably 4-5 gal/A)