



Navigating Insect Management Decisions Without Acephate

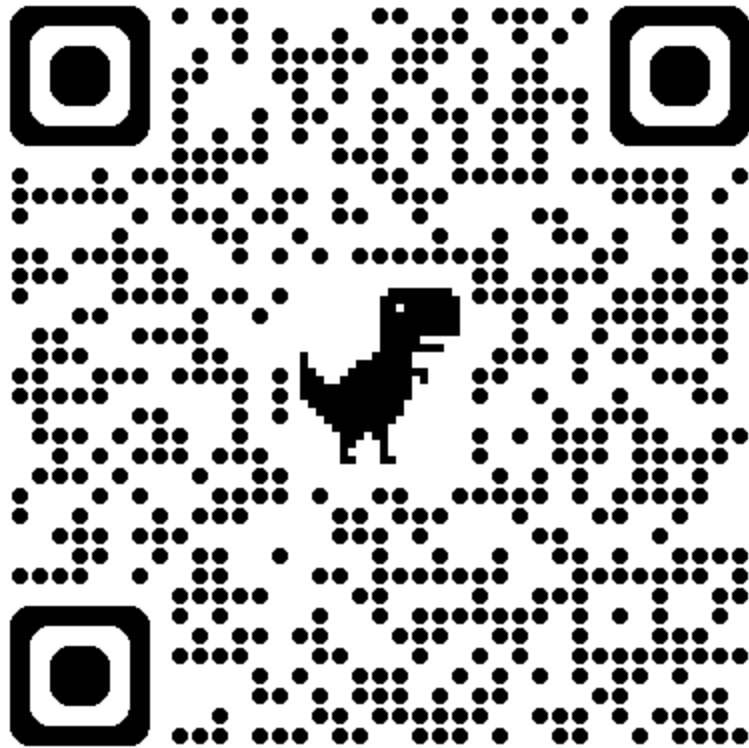
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PID: Cancellation of acephate label for usage in cotton, soybeans



EPA Proposes to Cancel All but One Use of Pesticide Acephate to Protect Human Health

Released on April 30, 2024

Today, the U.S. Environmental Protection Agency (EPA) is releasing a proposed interim decision (PID) to cancel all but one use of the pesticide acephate. This decision is based on EPA's updated human health draft risk assessment (HH DRA) and drinking water assessment (DWA) that were [released last year](#), which showed significant dietary risks from drinking water for currently registered uses of acephate. EPA also identified worker, homeowner, and ecological risks that would be mitigated by the proposed cancellations.

Acephate is an organophosphate (OP) pesticide that is registered for both agricultural uses, such as cotton and soybean, and non-agricultural uses, such as tree injections for forestry and ant mound treatment around homes. Acephate interacts with the nervous system by inhibiting the acetylcholinesterase (AChE) enzyme. This process makes the pesticide effective against insects, but it can also occur in mammals, including humans, depending on the level of acephate exposure. At high levels of OP exposures, AChE inhibition can lead to neurological effects such as tremors, fatigue, and nausea. AChE inhibition has been found to be the most sensitive human health effect for evaluating exposures to acephate.

The Agency is proposing to maintain the use of acephate for tree injection because it does not contribute to drinking water exposure, there are no risks for workers, and, with label changes, would not pose risks to the environment. Tree injections allow the pesticide to move throughout the tree to control pests. This use of acephate is only allowed for use on trees that do not produce food for human consumption.

Acephate is proceeding through EPA's standard registration review process. The revised HH DRA and DWA released in August 2023 and the PID released today are open for public comment for 60 days. Commenters may propose alternative mitigation for the Agency's consideration for some or all uses of acephate, and the Agency will respond to these comments in the Interim Decision. If EPA determines that alternative mitigation options that are voluntarily agreed to by the registrant can address the identified risks to satisfy the standard for continued registration of the pesticide, this could allow EPA to put protections in place faster than the statutorily required process for [involuntary cancellation](#) that can take up to five years. Acephate is one of 18 OPs currently in registration review, with many scheduled to have interim decisions between 2024-2026.

For more information on the registration review of acephate and to provide comments on the PID and updated assessments, please visit the acephate docket on [regulations.gov](https://www.regulations.gov) under the docket ID [EPA-HQ-OPP-2008-0915](#).

Last updated on April 30, 2024



PID: Dicrotophos Registration Review



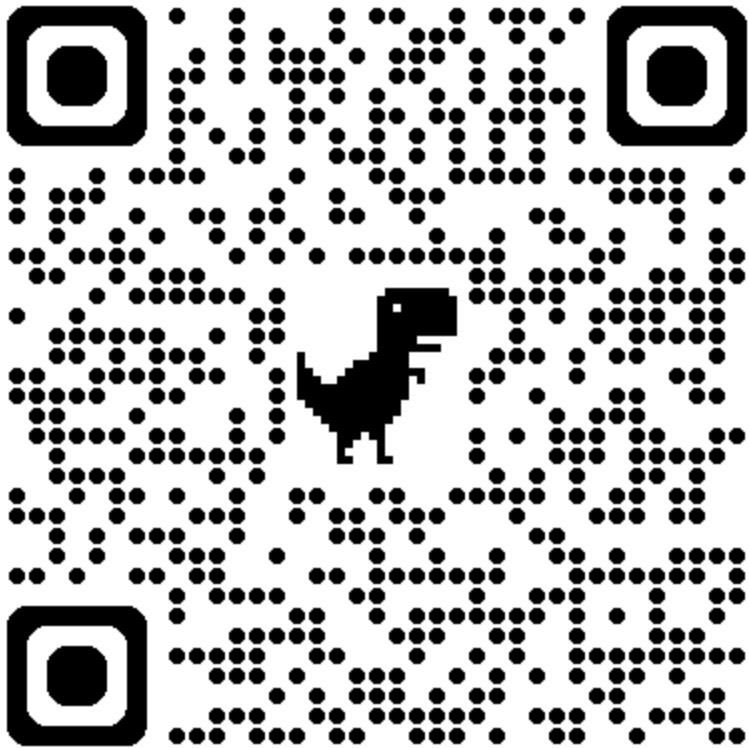
Given the extent of the risks identified, and, in certain cases, considering the benefits of use of dicrotophos, the Agency is proposing the following mitigation measures:

1. To mitigate non-occupational spray drift risks, the Agency is proposing a 300-foot buffer for aerial applications and a 25-foot buffer for ground applications. These buffers would apply to specific sites frequented by bystanders. The Agency is also proposing medium or coarser droplet size.
2. To mitigate occupational handler risks, the Agency is proposing to decrease the single maximum application rate from 0.5 lb ai/A to 0.4 lb ai/A for aerial application.
3. To mitigate risks to the birds, mammals, terrestrial and aquatic (freshwater and estuarine/marine) invertebrates, the Agency is proposing certain FIFRA IEM Measures.

***Reduction from 8 fl. oz/acre to 6.4 fl. oz/acre**



PID: Dimethoate Registration Review



On June 23, 2024, the United States Environmental Protection Agency (EPA) announced a proposed interim registration review and decision for dimethoate pesticide as required by the Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. 136a(g).

EPA published a notice of its interim decision for public review and comment. As set forth in its interim decision, EPA determined that the benefits of the use of dimethoate on crops such as corn, soybeans, and wheat, were low.





Tobacco Thrips

Thrips



Insecticide	Amount of Formulation per Acre	Pounds Active Ingredient per Acre	Acres 1 Gallon or 1 Pound Dry Will Treat	PHI (days)	Comments
Seed Treatments					
acephate (OP) *Orthene 90S	6.4 oz/cwt	-	-	-	Hopper box: 2.5-3.5 oz 90S/acre
imidacloprid (CN) Gaucho 600 Aeris	-	0.375 mg ai/seed	-	-	Field tests and lab assays in 2015 indicate possible tolerance building to imidacloprid with tobacco thrips.
In-Furrow Treatments					
acephate (OP) *Orthene 90S	1.1 lb	1.0	1	-	Spray in drill. Not working as well in some locations.
aldicarb (C) AgLogic 15GG	3.5-5 lb	0.53-0.75	0.29-0.2	90	Restricted-use pesticide with a danger/poison label designation. Read and follow label directions.
imidacloprid (CN) Admire Pro 4.6SC	7.4-9.2 oz	0.26-0.33	17-14	-	In-furrow spray directed on or below the seed.
Foliar Treatments					
acephate (OP) *Orthene 90S	0.22 lb	0.2	4.5	21	Use of acephate at this time in the season will intensify insecticide resistance problems in tarnished plant bugs and increase the likelihood of flaring spider mites.
dicrotophos (OP) *Bidrin 8E	3.2 oz	0.2	40	30	Bidrin may only be used before first square and after first bloom.
methoxyfenozide (IGR), spinetoram (SPN) Intrepid Edge 3SC	3-6 oz	-	43-21	28	
spinetoram (SPN) Radiant 1SC	1.5-3 oz	0.012-0.021	85-47	28	Surfactant is recommended with this product.

*Organophosphates are less consistent for thrips control. Use other alternatives if possible.

Tobacco Thrips % Mortality, 2024

Population	Spinetoram	Acephate	Dicrotophos
	Radiant	Orthene 97	Bidrin
MS Stoneville	100	30	69
MS Glendora	100	35	-
AR Marianna	100	32	-
AR Tillar	100	22	75
TN Milan	100	42	61
2023 Avg Mortality	100	42	57
2024 Avg Mortality	100	32	68

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Tarnished Plant Bugs

Plant Bug and Fleahopper

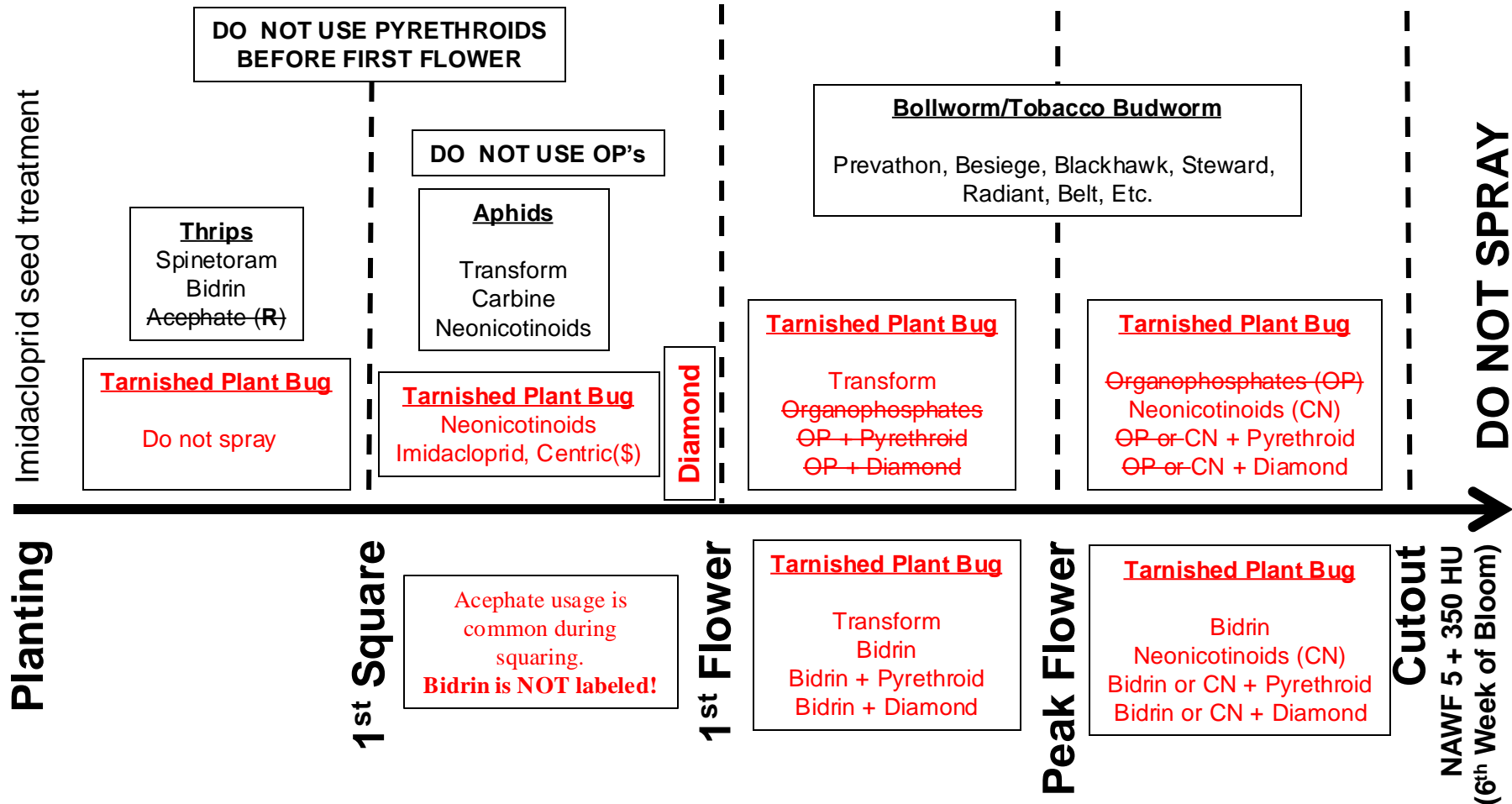


Insecticide	Amount of Formulation per Acre	Pounds Active Ingredient per Acre	Acres 1 Gallon or 1 Pound Dry Will Treat	PHI (days)	Comments
acephate (OP) *Orthene 90S	0.55–1.1 lb	0.5–1.0	1.8–0.9	21	Under heavy infestations, use highest labeled rates. Acephate– Not recommended for control of plant bugs before first bloom. After first bloom: 0.5–1.0 lb. ai/A.
bifenthrin (P), abamectin (AV) Athena 0.87EC	8–17 oz	0.13–0.15	5.3–4.6	20	
bifenthrin (P) + imidacloprid (CN) Brigadier 2EC	5.1–7.7 oz	–	25–17	14	
dicrotophos (OP) *Bidrin 8E	4–8 oz	0.25–0.5	32–16	30	Dicrotophos (Bidrin) may only be used before first square and after first bloom, with a minimum of 14 days between applications.
dicrotophos (OP) + bifenthrin (P) Bidrin XP11 5EC	8–12 oz	–	16–10	30	Do not apply prior to bloom.
dimethoate (OP) *Dimethoate 4EC	8–16 oz	0.25–0.5	16–8	14	
imidacloprid (CN) + β-cyfluthrin (P) Leverage 360EC	2.8–3.2 oz	–	45–40	14	
novaluron (IGR) Diamond 0.83EC	6–9 oz	0.04–0.06	21.3–14.2	30	Novaluron (Diamond) acts only on immature plant bugs and should be tank-mixed with a labeled adulticide. Use of novaluron (Diamond) during the third week of squaring or peak migration of adult plant bugs into cotton has shown benefits in protecting yield.
oxamyl (C) *Vydate C-LV 3.77	11.2–17 oz	0.33–0.5	11.4–7.5	14	
sulfoxaflor (SX) Transform 50WG	1.5–2.25 oz	0.047–0.071	10.7–7.1	14	
thiamethoxam (CN) + λ-cyhalothrin (P) Endigo ZCX 2.7CS	4.0–4.5 oz	–	32–28	21	

*Organophosphates tank-mixed with pyrethroids have proven to provide effective control of tarnished plant bugs after bloom.

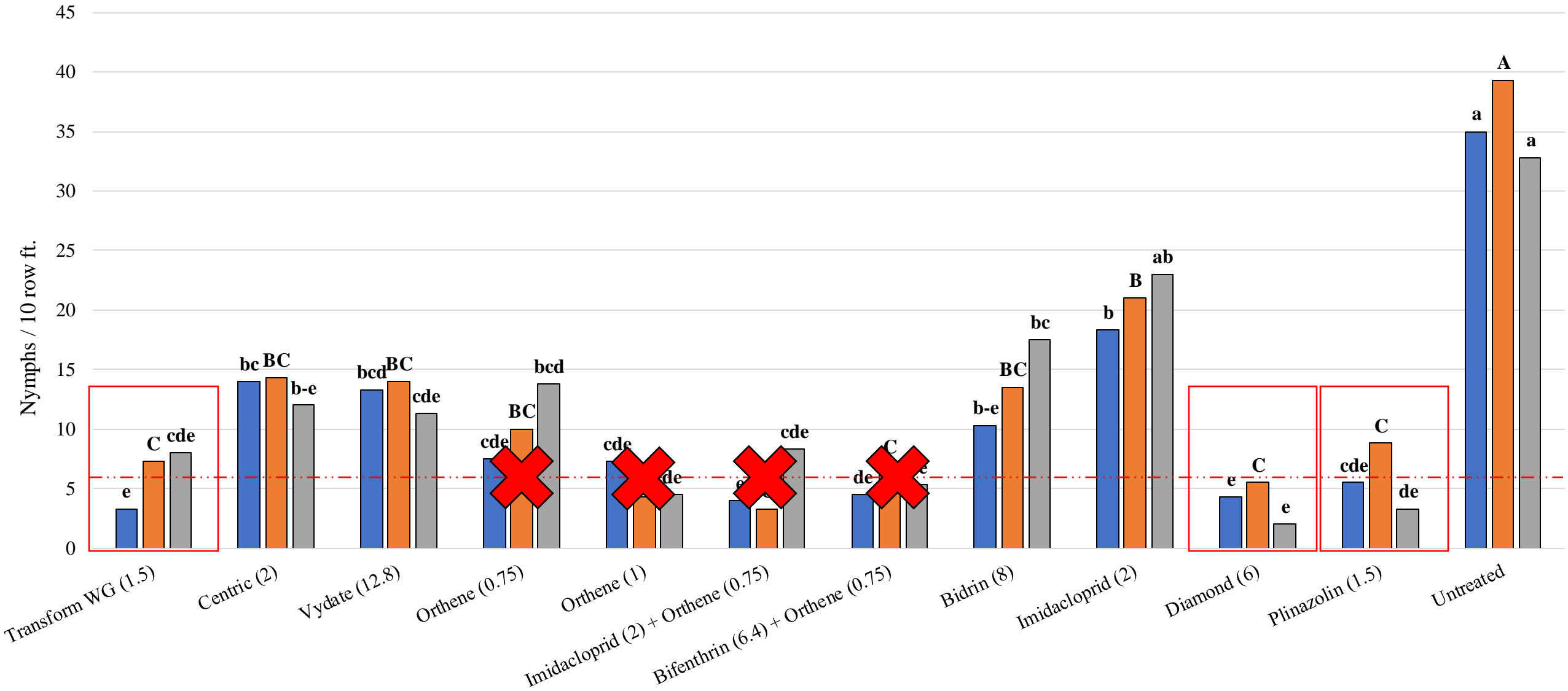


Mississippi Rotational Strategies – Minus Acephate



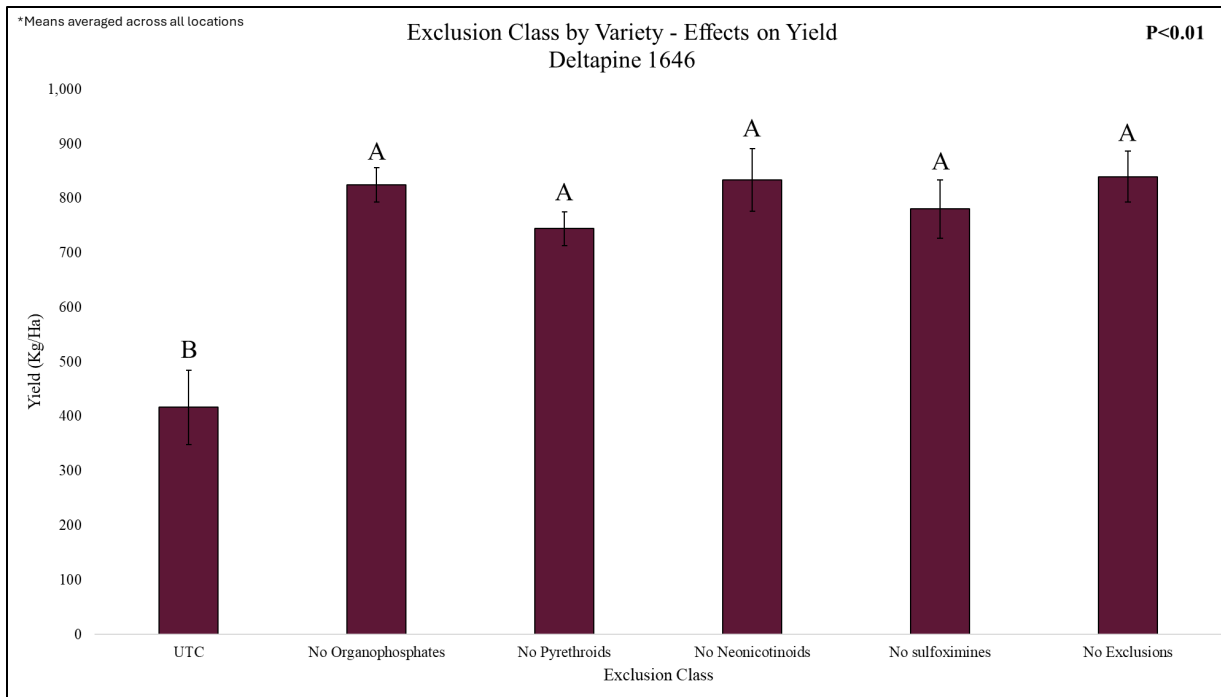
Foliar Insecticides for TPB Control Stoneville, MS – 2024

■ 4 DAA ■ 7 DAA ■ 9 DAA

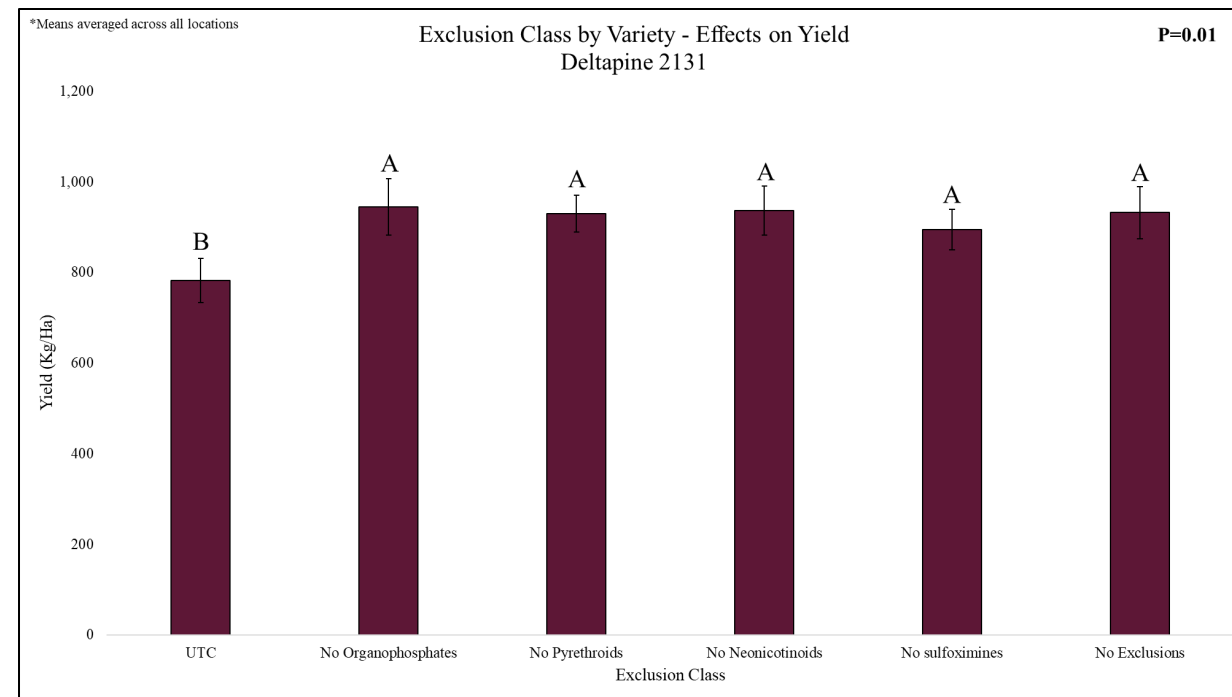


Insecticide Class Exclusion Study Stoneville, Glendora MS (2023)

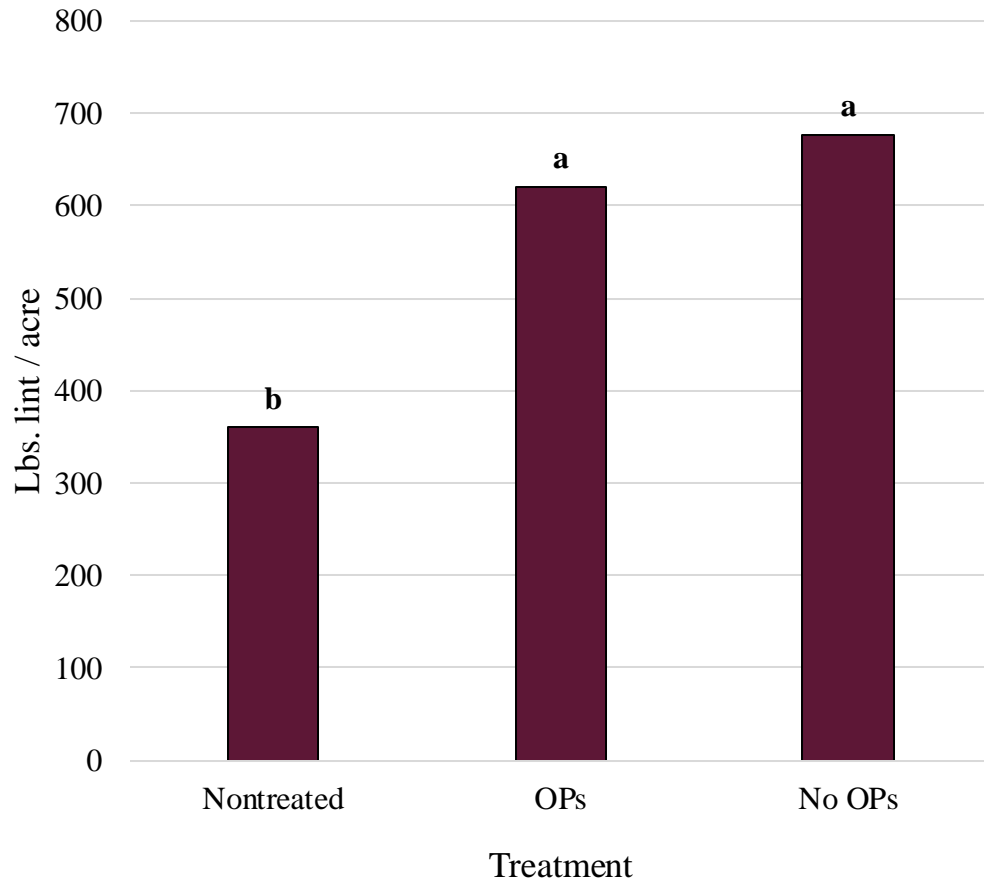
Non-ThryvOn Cotton



ThryvOn Cotton



Large Block OP Exclusion Study Stoneville, MS (2024)



*** Both treatments received 4 applications targeting tarnished plant bugs**



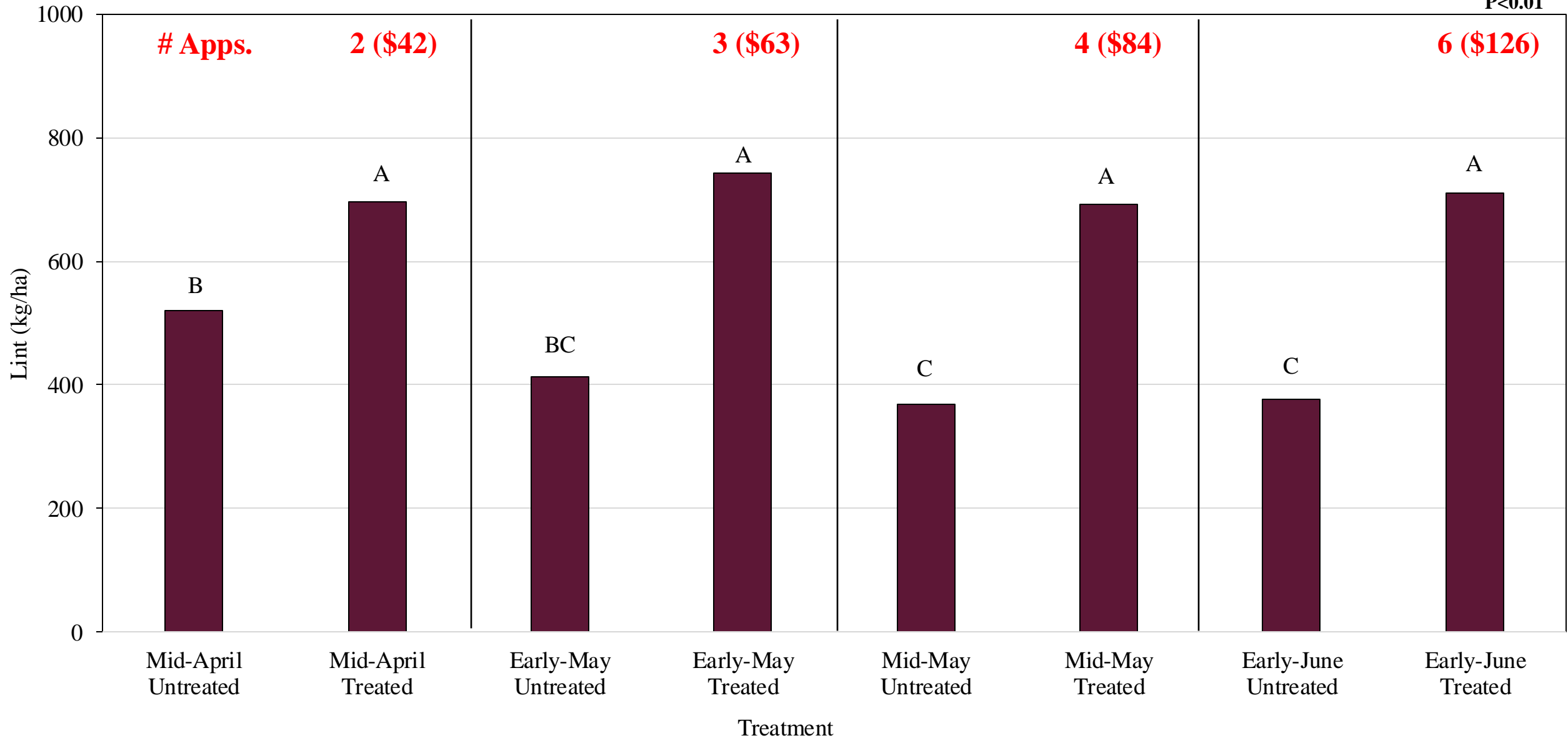
Floral Foam Assays – Transform WG (Sulfoxaflor)

Collection Location	Baseline LC ₅₀	LC ₅₀ (PPM) [RR]	
		2010	2023
Mississippi (4), (3), (1)	0.73	1.69 [2.31]	4.14 [5.67]
Arkansas (1), (1), (1)	0.31	0.90 [2.9]	2.48 [8.0]
Louisiana (1), (1), (1)	0.61	1.96 [3.2]	2.34 [3.83]
Tennessee (1), (1), (1)	0.32	0.56 [1.75]	0.90 [2.81]
Missouri (0), (1), (0)	-	0.64 [n/a]	-



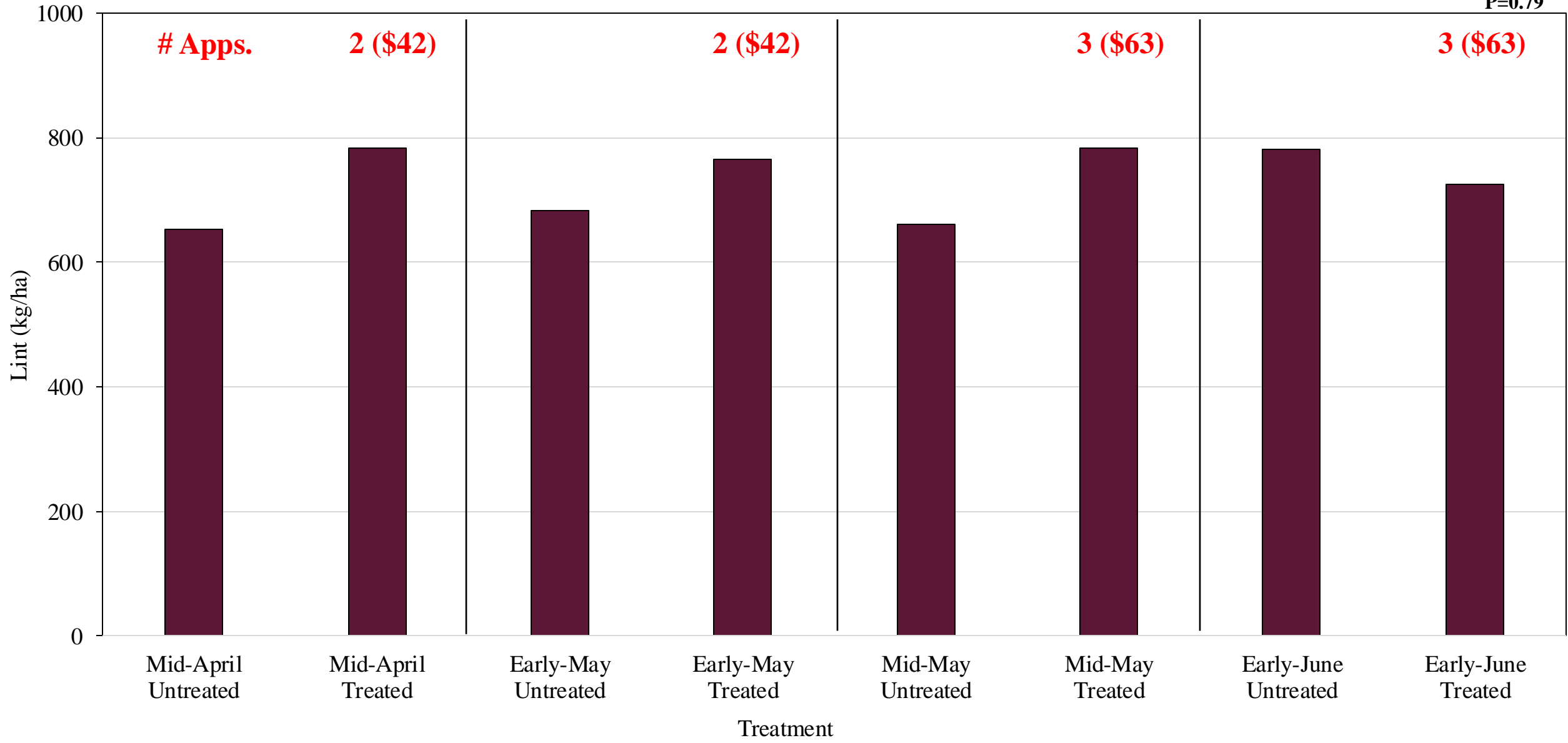
Effects of Planting Date on TPB Management and Cotton Yields (2024) Deltapine 2333 Bg3XF

P<0.01




Effects of Planting Date on TPB Management and Cotton Yields (2024) Deltapine 2328 Bg3TXF

P=0.79



Bollworm Management

- Bifenthrin + Acephate provides acceptable bollworm suppression
- Diamide durability is a prominent concern
- Other worm products labeled provide no TPB suppression
- If needed, what's the new rotation for bollworm?
 - Diamond & Bifenthrin/Lambda?

<i>Bollworm and Budworm</i>		Insecticide	Amount of Formulation per Acre	Pounds Active Ingredient per Acre	Acres 1 Gallon or 1 Pound Dry Will Treat	PHI (days)	Comments
		Foliar Larvicides					
→	chlorantraniliprole (D) Vantacor 5SC	1.2–2.5 oz	0.047–0.098	106.6–51.2	21	For Heliothine control (cotton bollworms and/or tobacco budworms), make the first application at rates of 0.066–0.088 lb ai per acre. Later applications can be at rates of 0.044–0.088 lb ai per acre, depending on pest pressure.	
→	chlorantraniliprole (D), bifenthrin (P) Elevest 2.22SC	5.6–9.6 oz	–	22.8–13.3	21	For Heliothine control (cotton bollworms and/or tobacco budworms), make the first application at rates of 0.167 lb ai per acre. Later applications can be at rates of 0.098–0.167 lb ai per acre, depending on pest pressure.	
→	indoxacarb (OX) Steward 1.25EC	9.2–11.3 oz	0.09–0.11	14–11.3	14		
→	λ-cyhalothrin (P), chlorantraniliprole (D) Besiege 1.25CS	6.5–12.5 oz	–	20–10	21		
→	methoxyfenozide (IGR) + spinetoram (SPN) Intrepid Edge 3SC	7–8 oz	–	32–16	28	Do not exceed 12 oz of formulated product per year.	
→	spinetoram (SPN) Radiant 1SC	2.8–8 oz	0.022–0.0625	46–16	28		
→	spinosad (SPN) Blackhawk 36WG	1.6–3.2 oz	0.036–0.072	10–5	28		

Pyrethroid insecticides are no longer recommended for control of cotton bollworms or tobacco budworms in Mississippi due to widespread resistance and control failures. However, used as an ovicide in Bt cottons, it provides marginal control. See individual product labels for information.





Stinkbugs

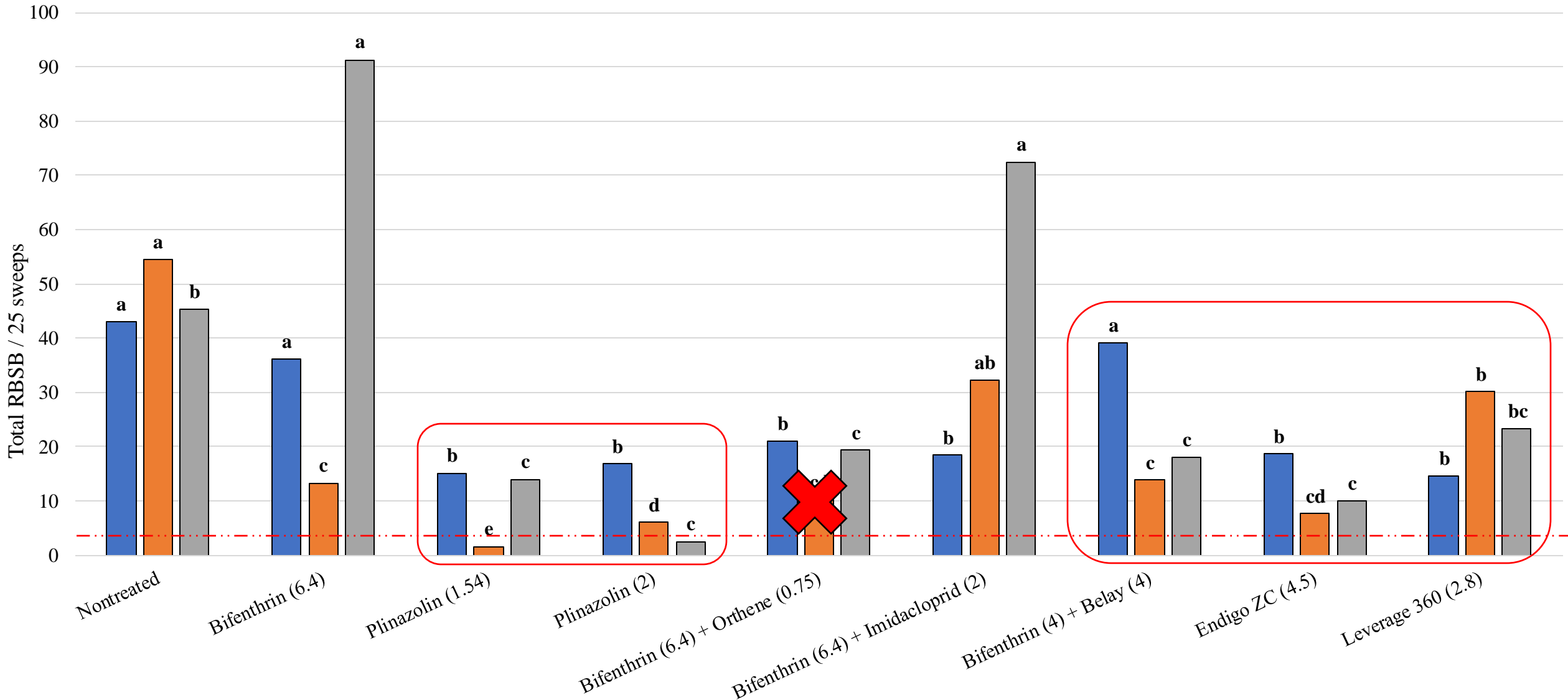
- Main concern is RBSB
- Neonic + pyrethroid tank mixes provide knockdown; little residual
- What else is there?

Redbanded Stink Bug

Insecticide	Amount of Formulation per Acre	Pounds Active Ingredient per Acre	Acres 1 Gallon or 1 Pound Dry Will Treat	PHI (days)	Comments
acephate (OP) Orthene 90S	0.56–1.1 lb	0.56–1.1	1.0–0.5	14	Do not harvest for hay or forage. Apply by air at 5–10 GPA and by ground at 10–50 GPA. Maximum AI per acre per season: 1.5 lb.
→ bifenthrin (P) Brigade 2EC Discipline 2EC Fanfare 2EC	2.1–6.4 oz	0.033–0.10	61–20	18	Do not apply more than one time per 30-day interval.
→ thiamethoxam (CN), λ-cyhalothrin (P) Endigo ZCX 2.7CS	4.5 oz	–	28	30	
Tank Mix Options with Bifenthrin					
acephate (OP) Orthene 90S	0.56–1.1 lb	0.56–1.1	1.0–0.5	14	Do not harvest for hay or forage. Apply by air at 5–10 GPA and by ground at 10–50 GPA. Maximum AI per acre per season: 1.5 lb. Tank mix with 5.12 fl oz of bifenthrin (Brigade 2EC or generic) per acre. Tank mixes have proven to give superior control.
→ clothianidin (CN) Belay 2.13SC	3–6 oz	0.05–0.10	42.7	21	
→ imidacloprid (CN) Imidacloprid 4F	1.5 oz	0.047	85.3	21	
→ Imidacloprid 2F	3 oz	0.047	42.7	21	

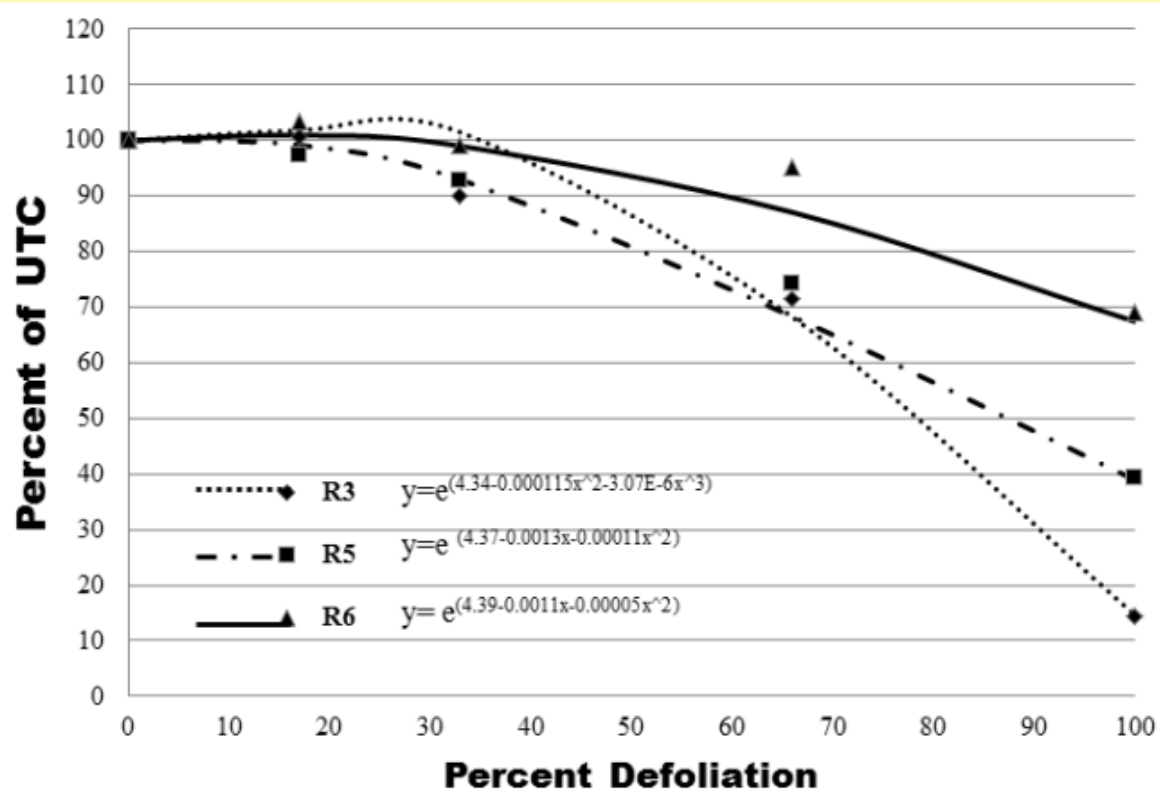
Foliar Insecticides for RBSB Control Winnsboro, LA – 2022

■ 3 DAA ■ 6 DAA ■ 12 DAA



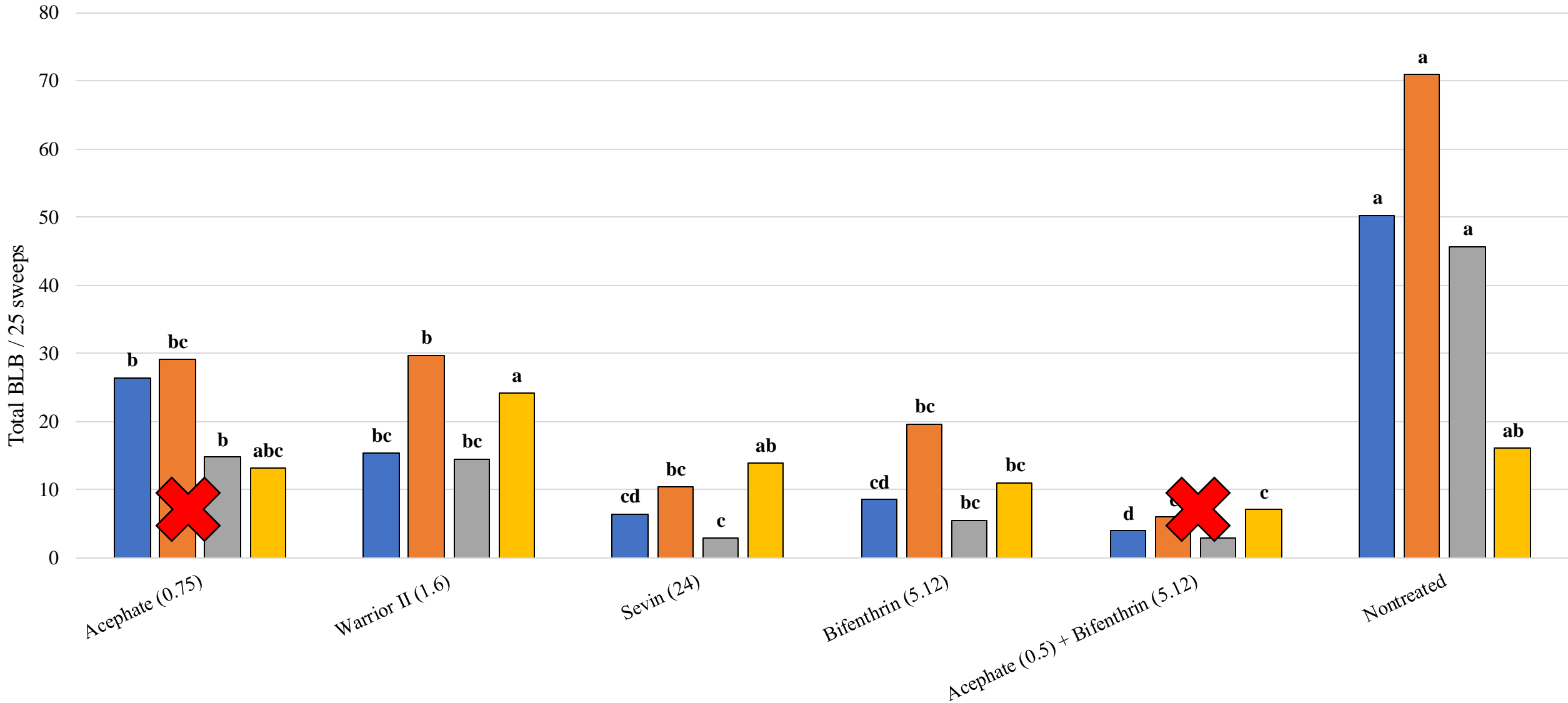


Yield Loss for Each Growth Stage from Whole Plant Defoliation



Foliar Insecticides for Bean Leaf Beetle Control
Stoneville, MS – 2023

■ 4 DAA ■ 6 DAA ■ 8 DAA ■ 13 DAA



Preharvest Intervals by Crop

Crop	Product	Preharvest Interval (Days)
Cotton	Acephate	21
Cotton	Bidrin	30
Cotton	Diamond	30
Cotton	Warrior II	21
Cotton	Endigo ZCX	21
Cotton	Brigade	14
Cotton	Dimethoate	14
Cotton	Transform WG	14
Cotton	Leverage 360	14

Crop	Product	Preharvest Interval (Days)
Soybean	Acephate	14
Soybean	Besiege	30
Soybean	Diamond	30
Soybean	Warrior II	30
Soybean	Endigo ZCX	30
Soybean	Baythroid XL	21
Soybean	Mustang Max	21
Soybean	Sevin	21
Soybean	Leverage 360	21
Soybean	Dimethoate	21
Soybean	Brigade	18

Green denotes similar PHIs, not similar control!



Best Case Scenario – Acephate Label

EPA does not vacate the labels and maximum AI usage rates are decreased

- Current labeled rates:
 - Cotton – 4 lbs. AI/acre/year
 - Soybean – 2 lbs. AI/acre/year [24(c) label for RBSB control]
- Bare minimum rates:
 - Cotton – 1.5 lbs. AI/acre/year
 - Soybeans – 1 to 1.5 lbs. AI/acre/year



Worst Case Scenario: What are we going to do?

- Early planting for both cotton and soybeans
 - Helps alleviate pest pressure
 - ThryvOn Cotton
- Bad RBSB year? Arguably the biggest hurdle, no other realistic control options
- Plinazolin technology – Not an acephate “replacement”
 - Pros: Longer residual, novel MOA, broad spectrum
 - Cons: Slower knockdown, higher input cost, registration hurdles
- Chemistry rotation the best we can; revisit lesser-used chemistries?



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