Tobacco Thrips Management and Resistance Update

2023 Mississippi Row Crop Short Course
December 4 – 6, 2023
Starkville, MS

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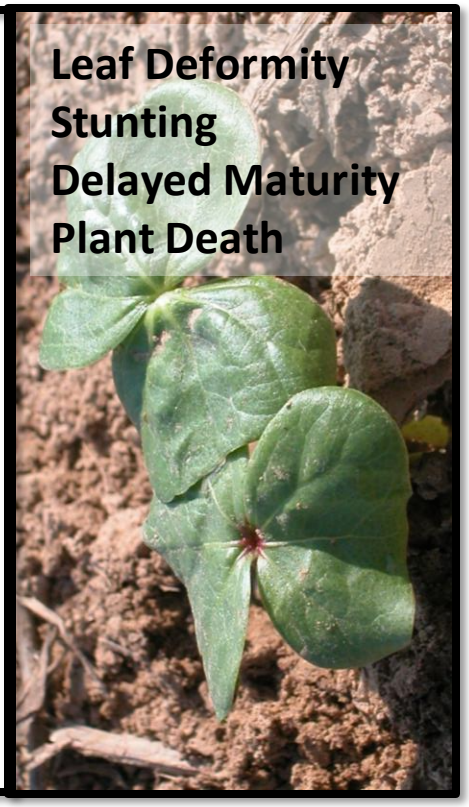
Background

- Early-season pest of seedling cotton
- Both adults and immatures injure seedlings
- ~80% Tobacco Thrips, *Franklinella fusca* (Hinds) in the Mid South/Southeast
  Stewart et al. (2013) J. Cotton Sci.
- Injury can cause delayed maturity and yield loss
  $7.6 million control costs+yield loss TN (2020)
  Cook and Threet (2021) Proc Beltwide Cotton Conf.



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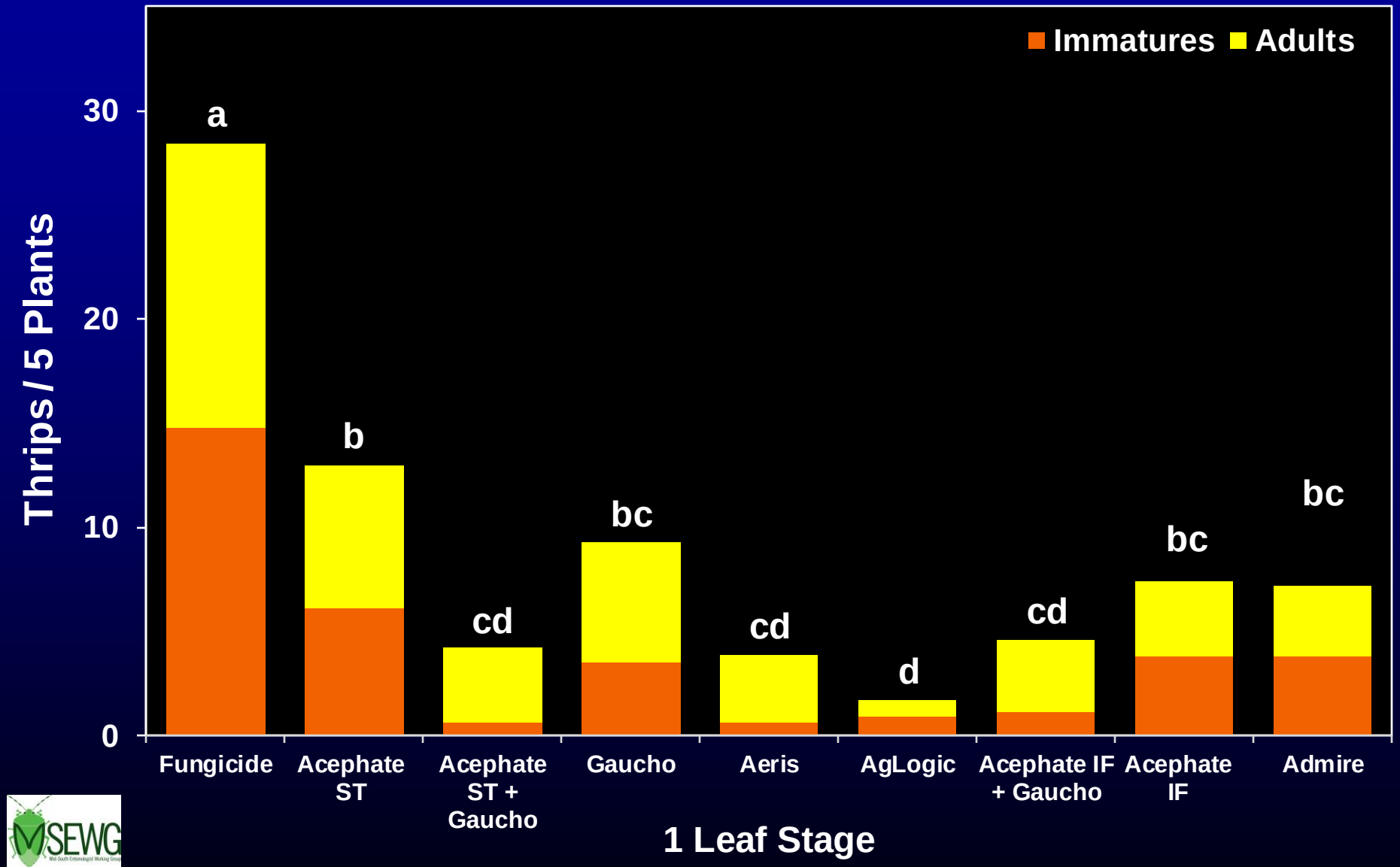
Current Thrips Control Options

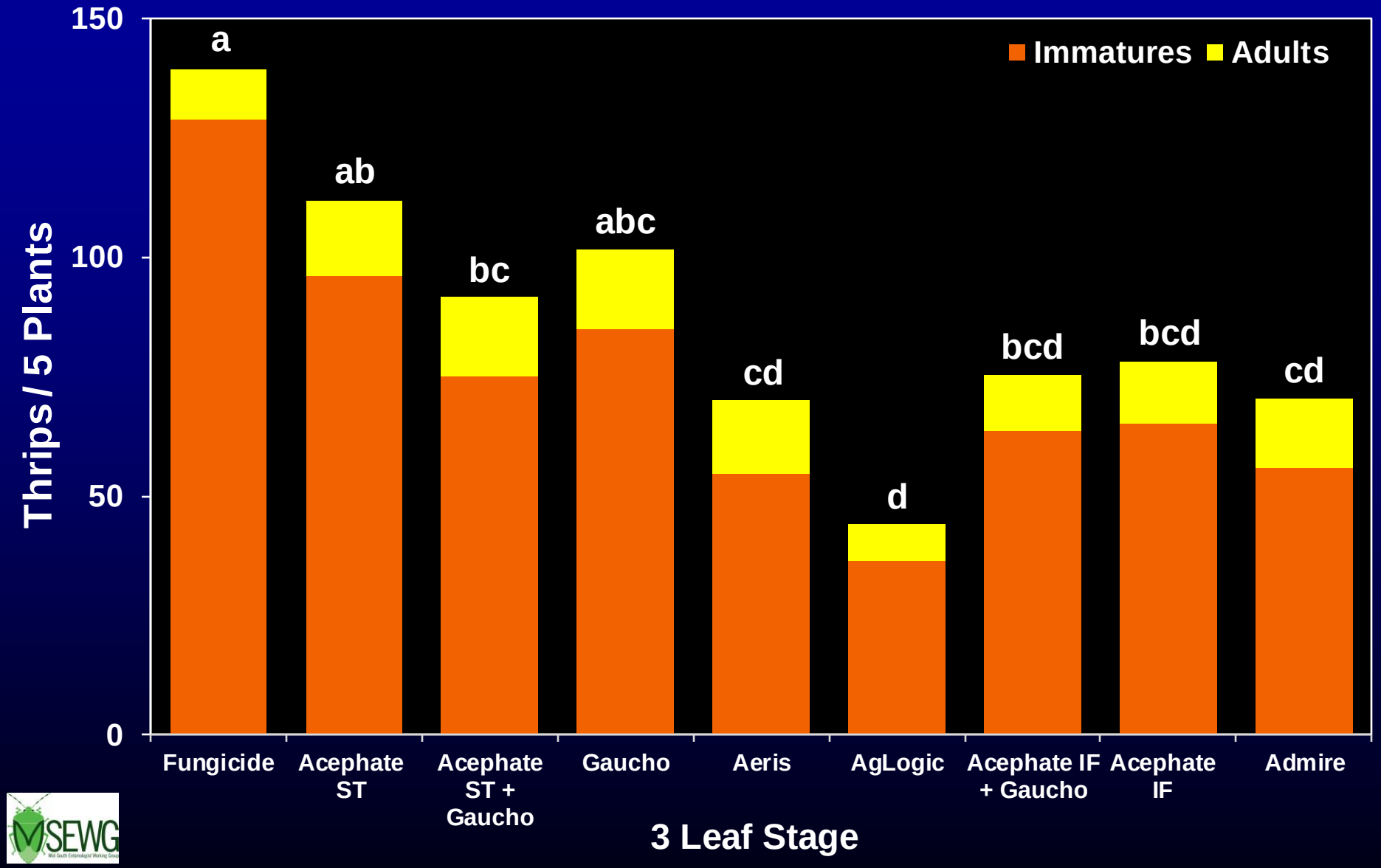
At-Planting Insecticide Treatments			*Issues*	Rescue Treatments	
Mode of Action	**Active Ingredient**	**Application**		**Mode of Action**	**Active Ingredient**
Carbamate	Aldicarb	Granular	***Resistance***		
Organophosphate	Acephate	Seed treatment In-furrow	***Weather***	***Organophosphate***	Acephate Dicrotophos Dimethoate
Neonicotinoid	~~Thiamethoxam~~ Imidacloprid	Seed treatment In-furrow	***Pressure***	***Spinosyns***	Spinetoram

Resistance to neonicotinoids: Vineyard et al. (2017) J. Cotton Sci., Huseth et al. (2016) Pest Manag. Sci., Darnell et al. (2018) J. Econ. Entomol.

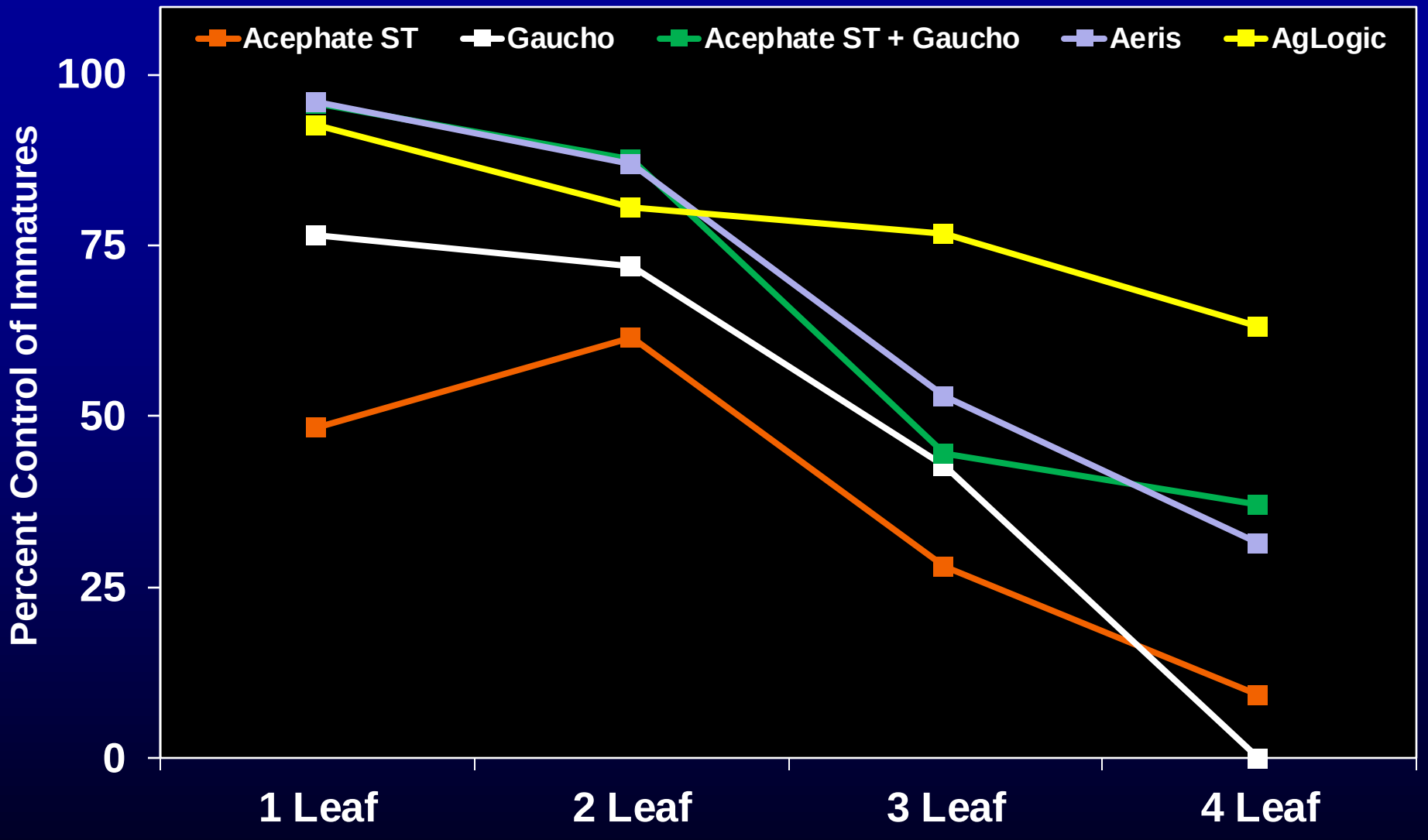
Impact of At-Planting Treatments on Thrips Densities



Impact of At-Planting Treatments on Thrips Densities

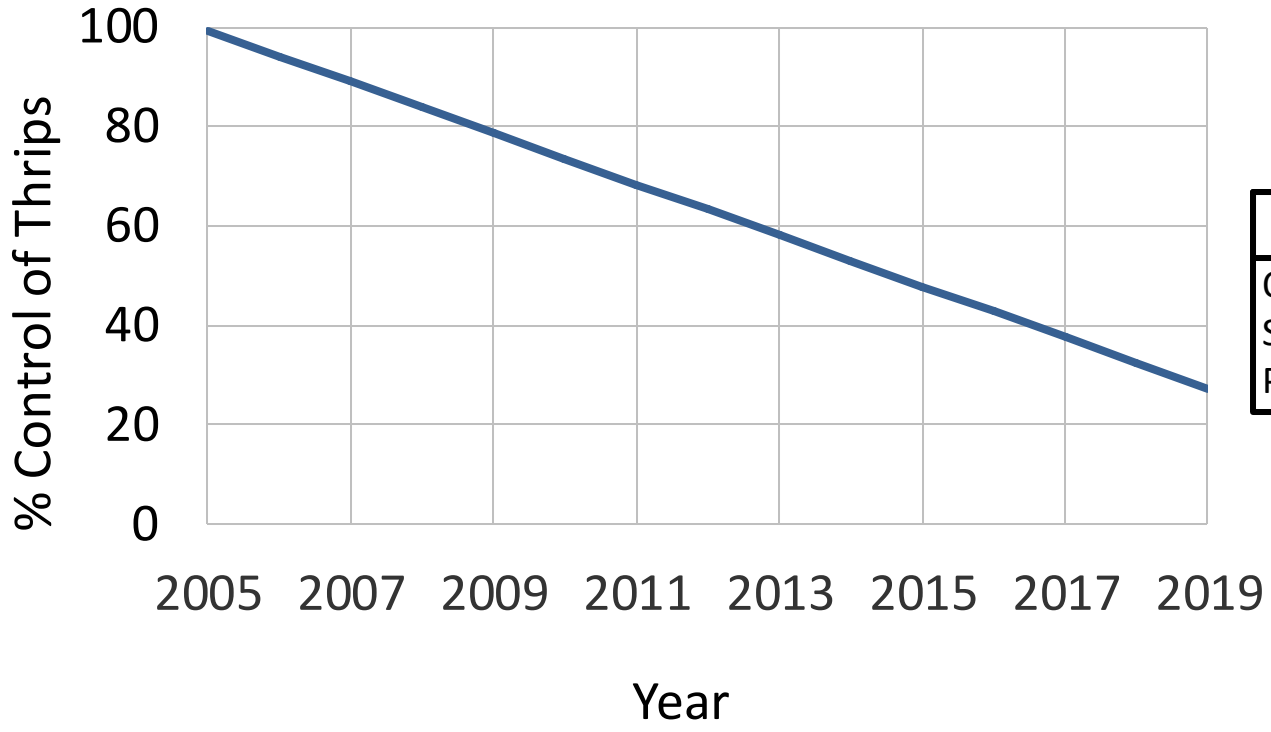


Impact of Seed Treatments on Thrips Immatures



All

Decreasing Performance of Acephate in Foliar Applications in Tennessee Field Trials

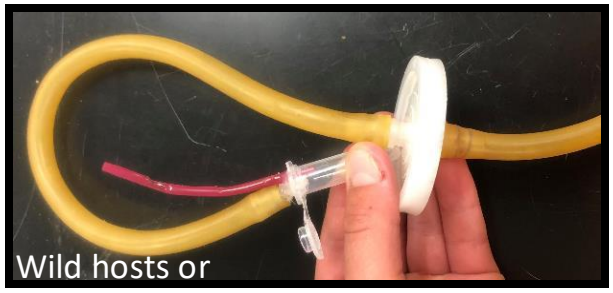


Acephate Control

Orthene (0.18-0.24 LB AI/A)
Slope = -5.1%
$P < 0.0001$, $R^2 = 0.40$

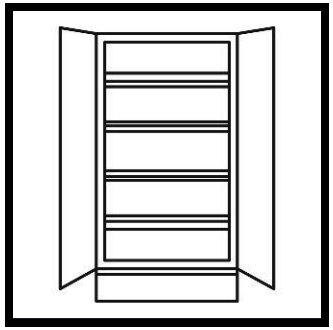
Leaf-Dip Bioassays (24 hours)

Collect Thrips

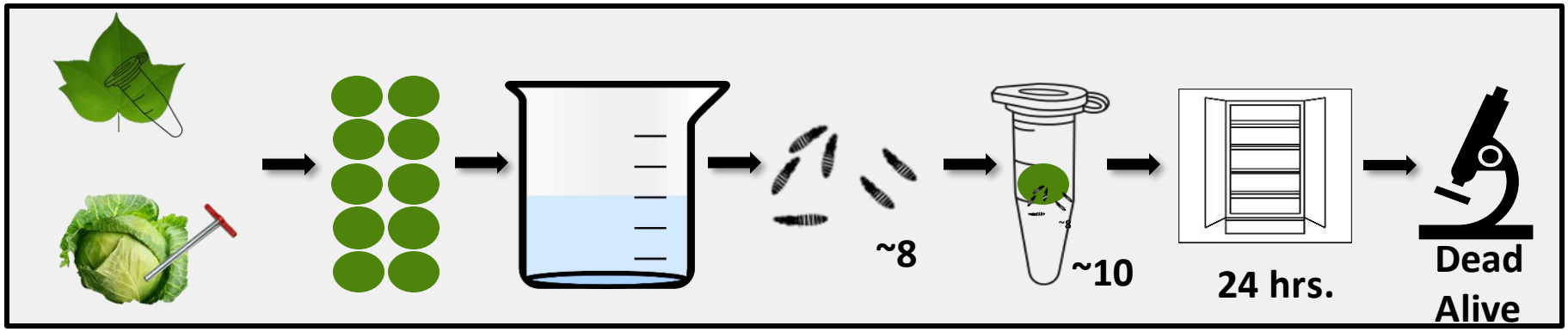


Deliver or Ship

Incubator



28±1°C
60-70% RH
14:10 L:D



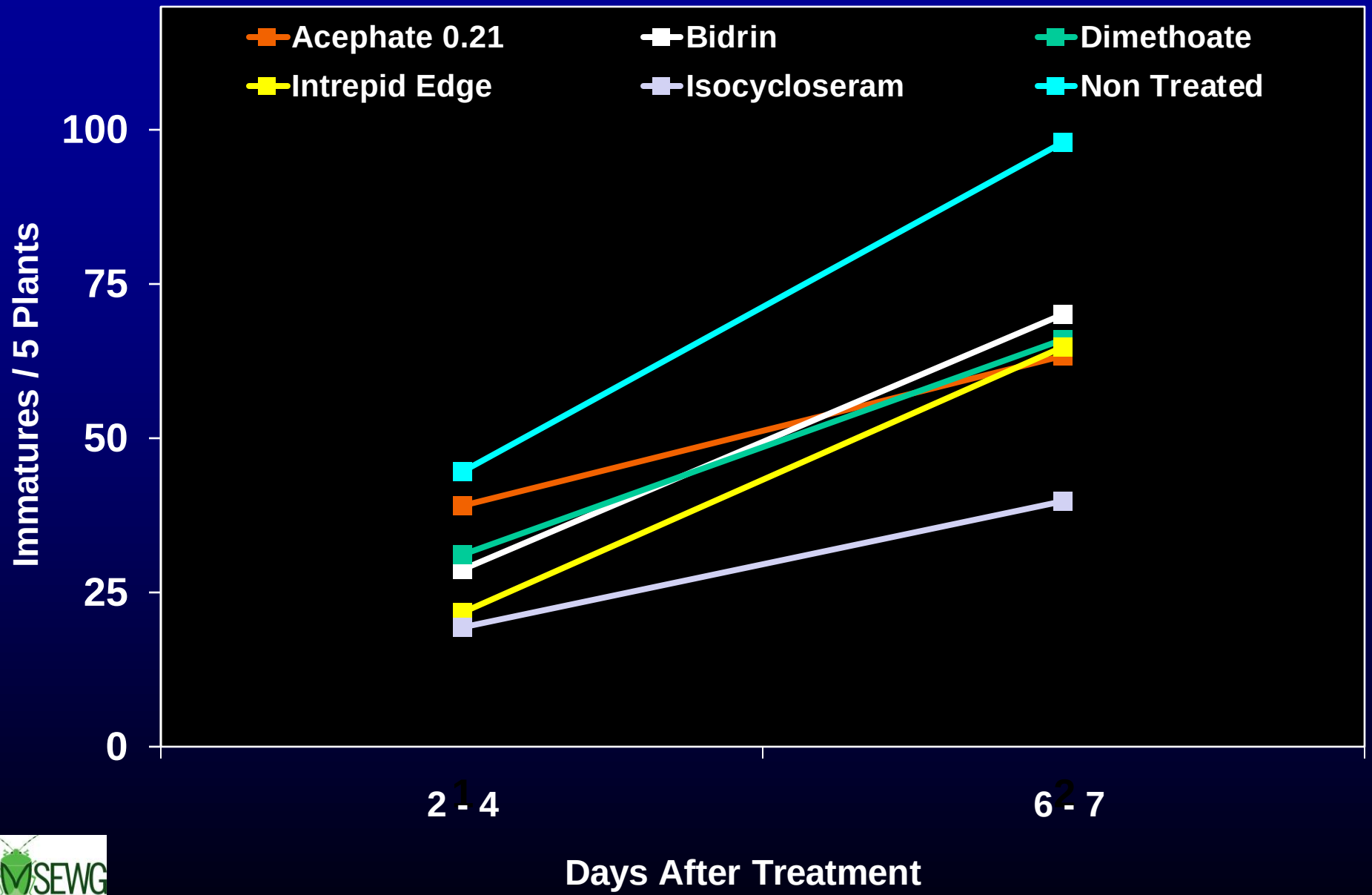
Tobacco Thrips % Mortality, 2022

	Spinetoram	Acephate	Dicrotophos
Population	**Radiant**	**Orthene 97**	**Bidrin**
NC Susceptible	100	95	86
NC Peanut	-	62	-
MS Stoneville	100	44	69
MS Starkville	100	80	50
AR Kaiser	100	25	-
AR Marianna	100	22	28
AR Tillar	100	55	61
AR Jonesboro	-	8	-
LA Tensas	100	44	85
TN Jackson	100	21	42
TN Milan	100	23	64
TN Rutherford	100	27	35
2021 Avg Mortality	100	73	67
2022 Avg Mortality	100	42	57

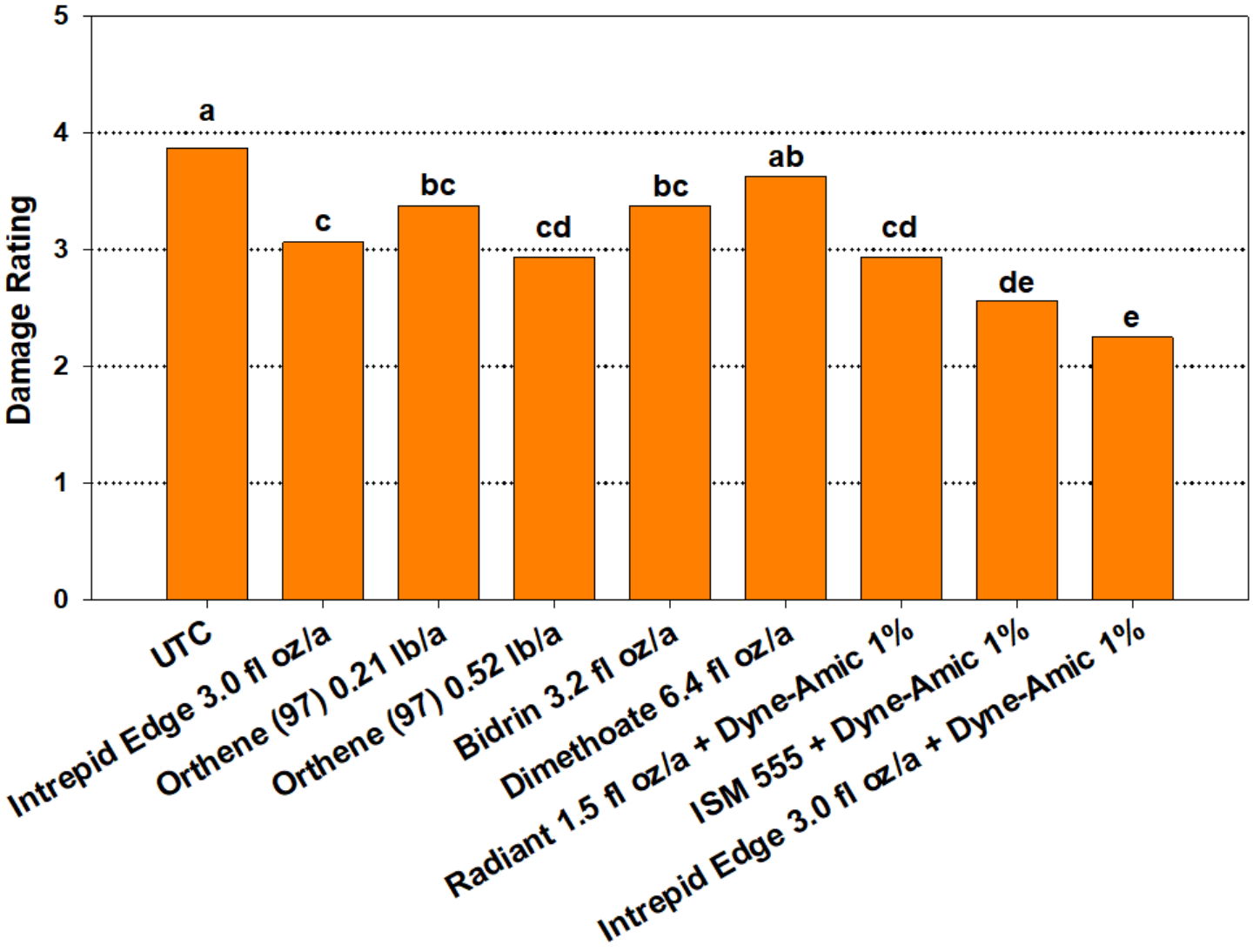
Tobacco Thrips % Mortality, 2023

	Spinetoram	Acephate	Dicrotophos
Population	**Radiant**	**Orthene 97**	**Bidrin**
NC	100	76	74
NC Peanut	100	91	-
MO Portageville	100	37	-
MS Stoneville	100	20	-
MS Sidon	100	42	44
MS Glendora	100	44	82
AR Keiser	100	31	-
AR Marianna	100	32	-
AR Tillar	100	41	38
TN Jackson	100	33	37
TN Milan	100	41	57
2022 Avg Mortality	100	42	57
2023 Avg Mortality	100	44	56

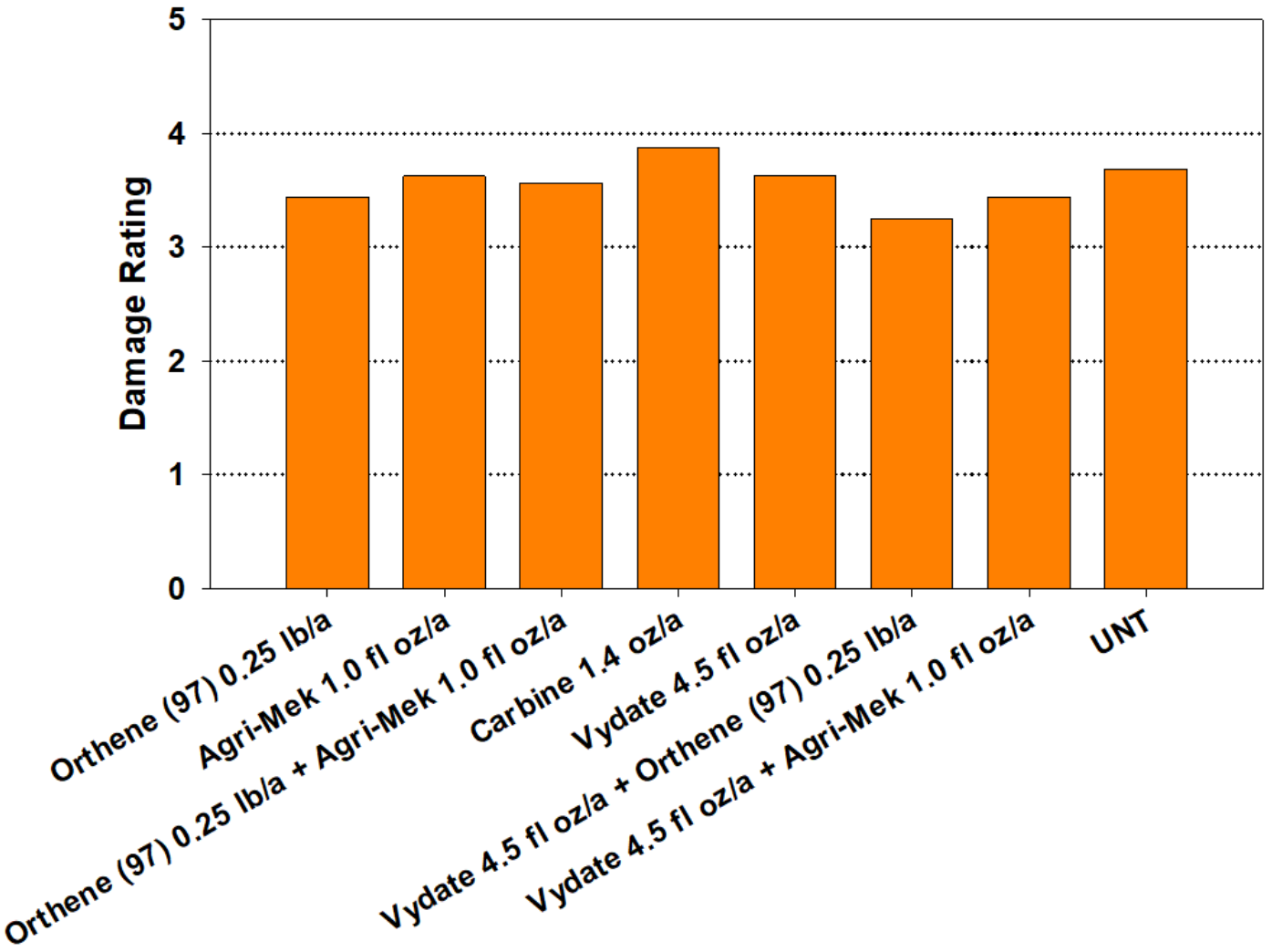
Impact of Foliar Treatments on Thrips



2022 Regional Foliar Thrips (2-3 TL)

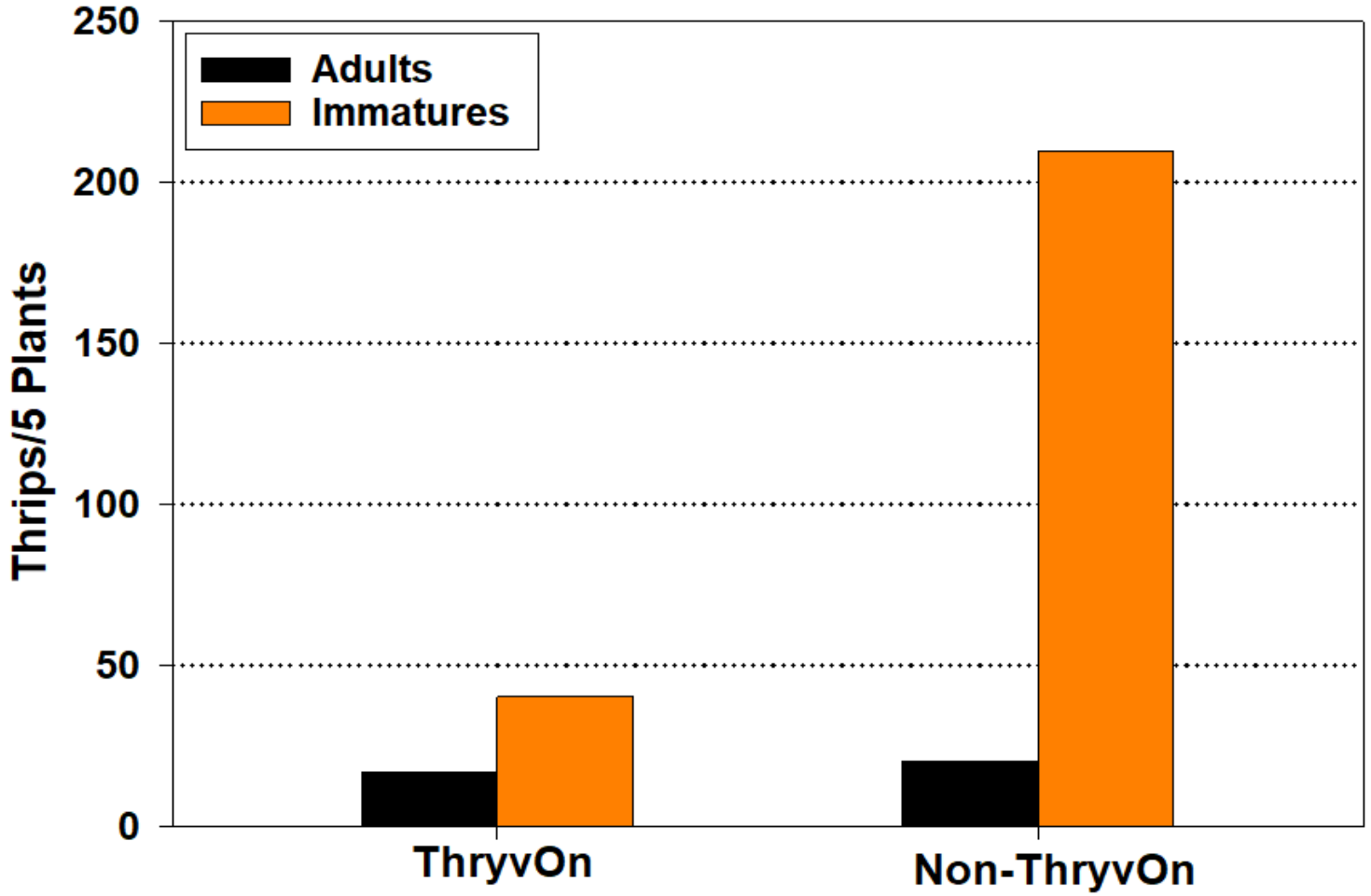


Foliar Thrips Alternatives (2-3TL)

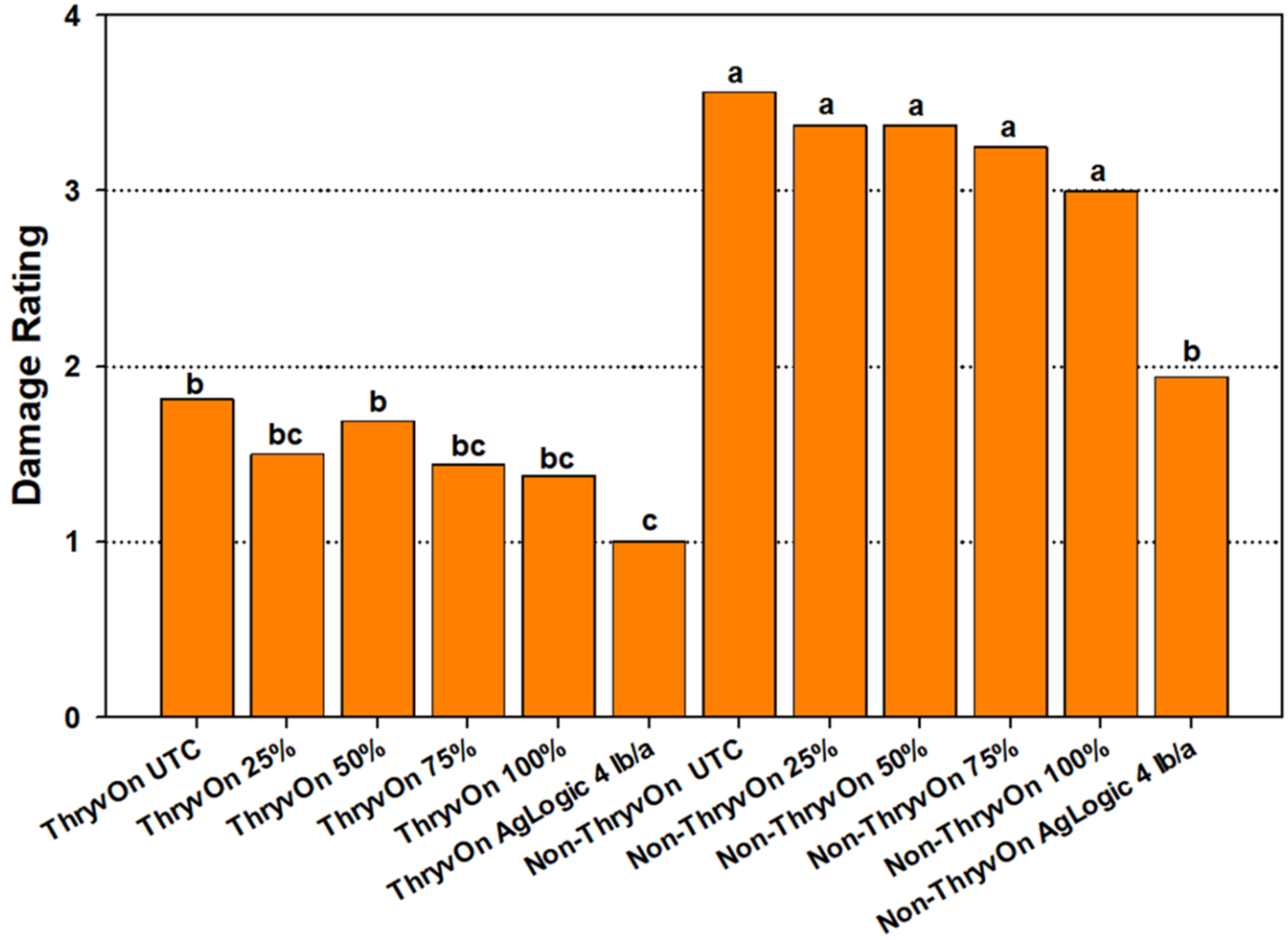


ThryvOn vs Non-ThryvOn

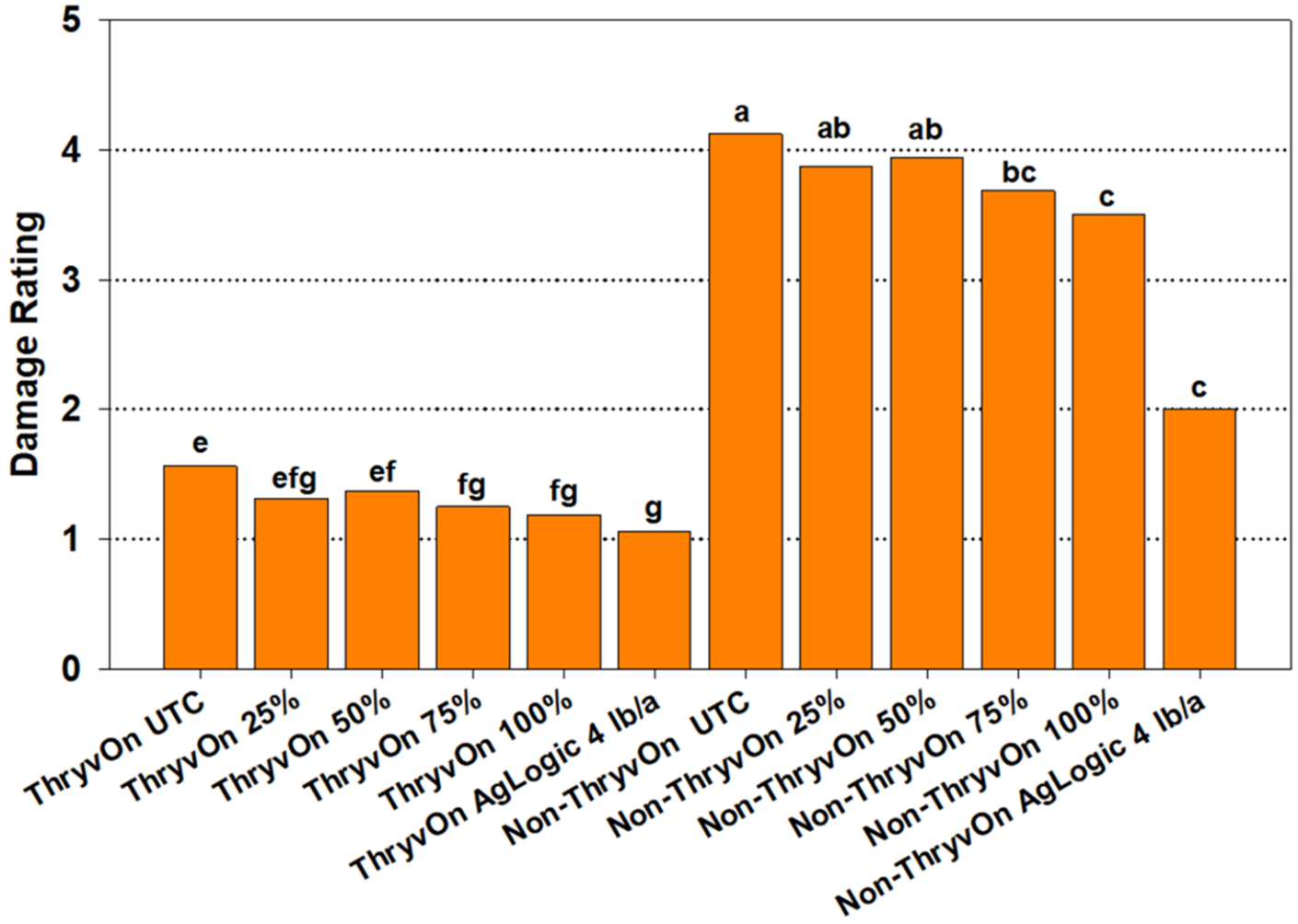
Thrips per 5 Plants



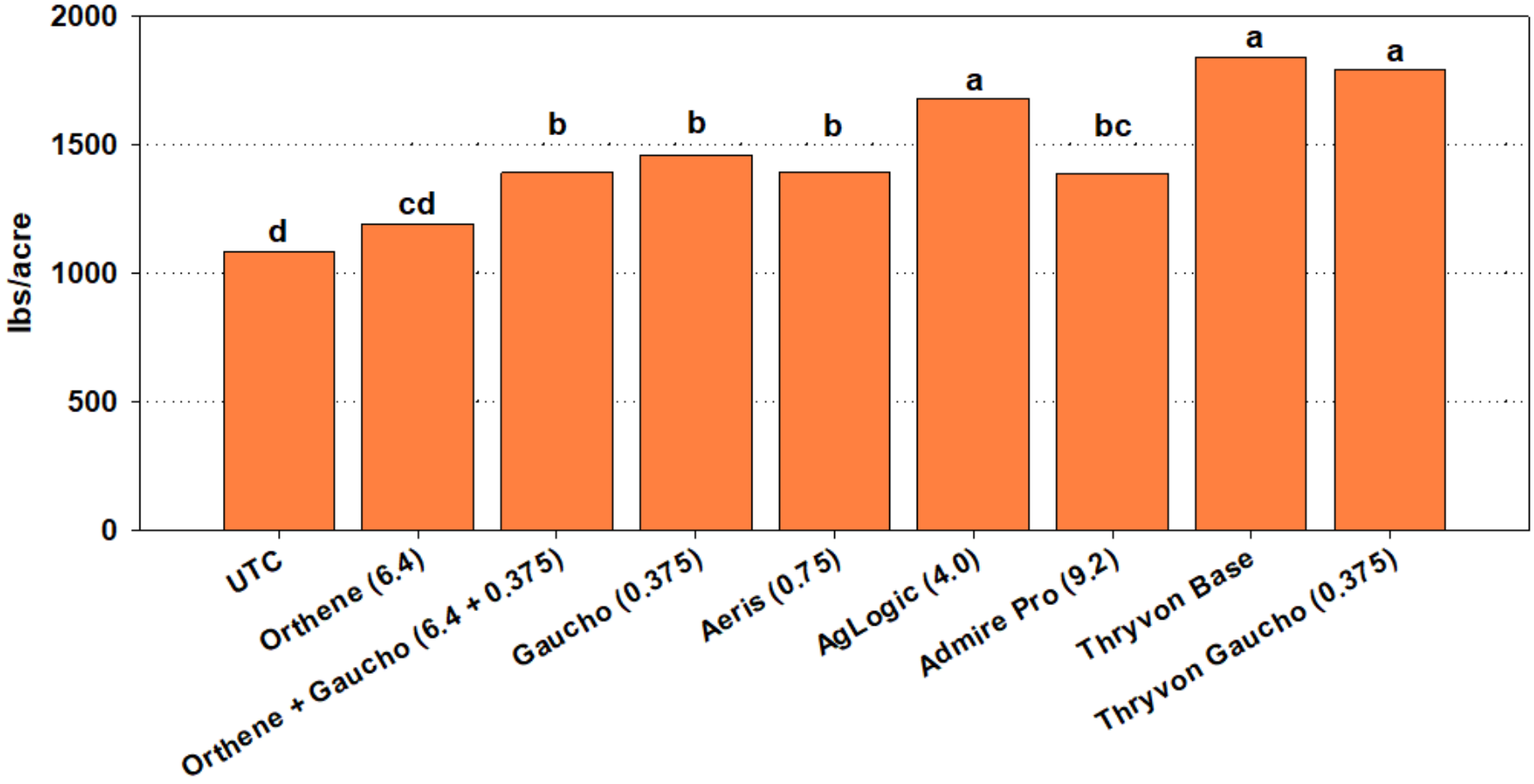
2022 MSU ThryvOn Thrips (1-2 TL)



2022 MSU ThryvOn Thrips (3-4 TL)



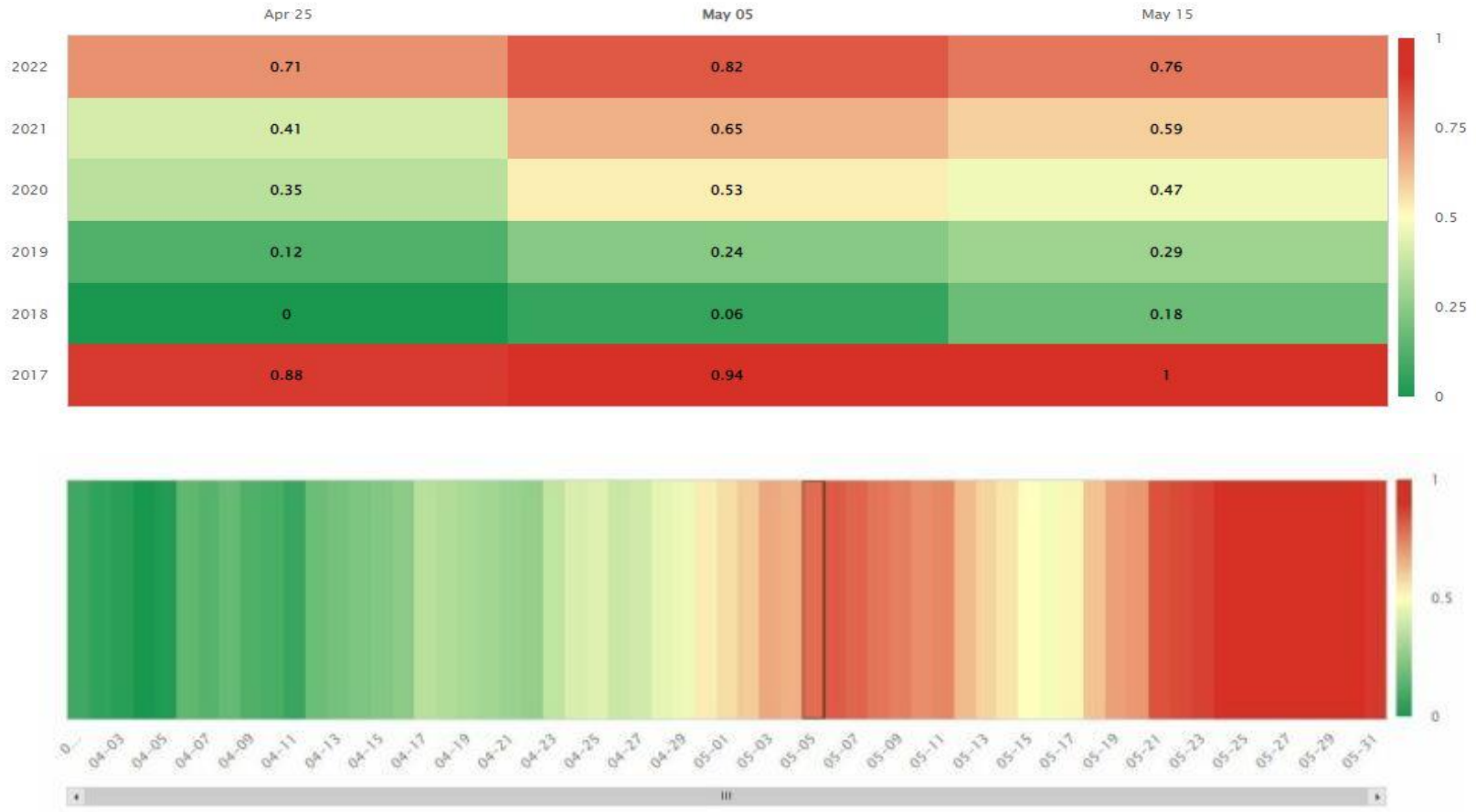
2023 Cotton IST Jackson, TN



Recommendations Going Forward

- Use OPs with caution/Be early
- Recolonization vs control
- Good seed treatments
- ThryvOn in high pressure areas
- Utilize thrips predictor model

https://products.climate.ncsu.edu/ag/cottontip/



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Thank You

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Future Work

- Continue to assay populations
- Identify the resistance mechanism
- Conduct assays + PBO
- ThryvOn?