

Chemical Control of *Thrips parvispinus*



Tuesday, October 1, 2024

Alexandra M. Revynthi

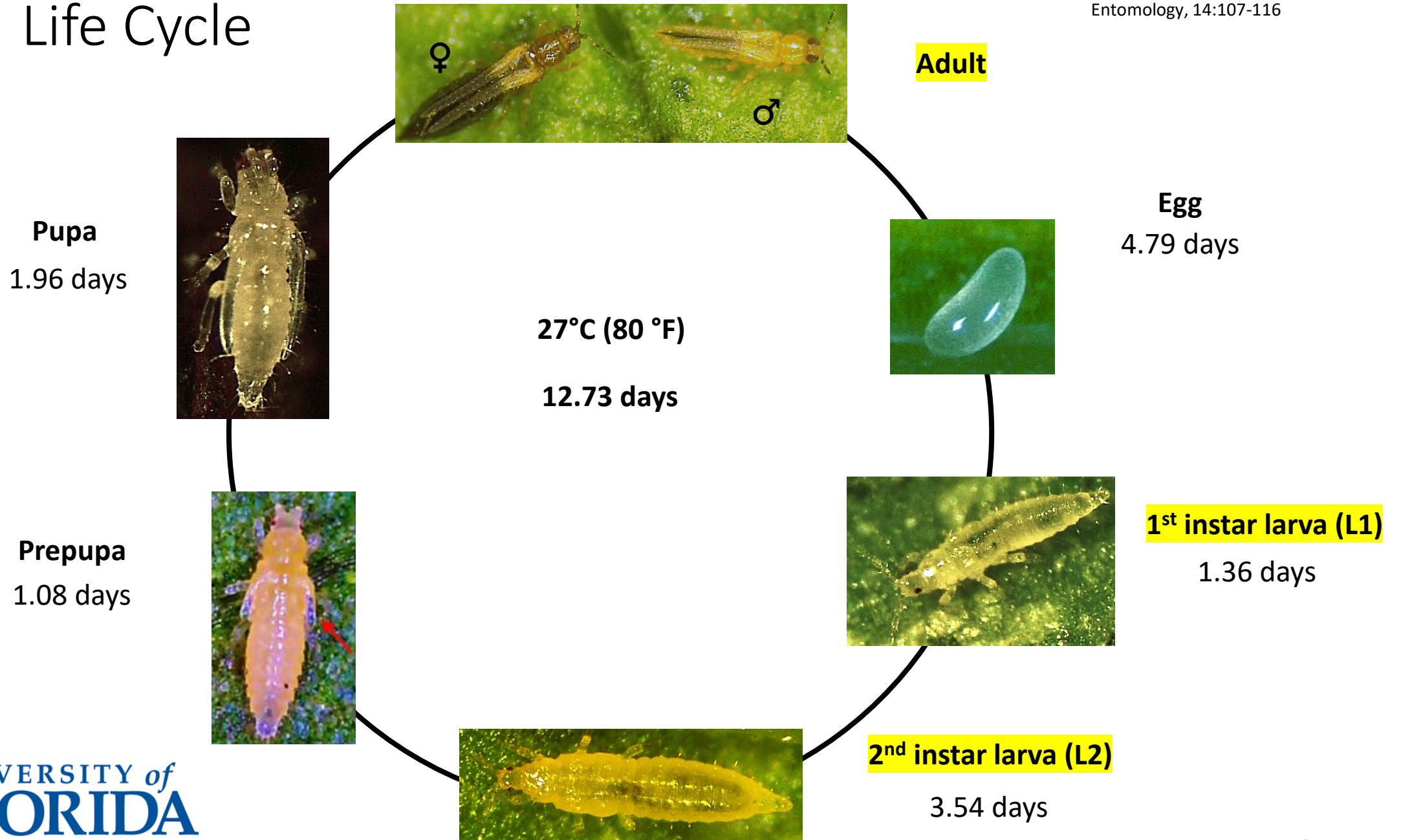
Livia Ataide, German Vargas, Yisell Velazquez-Hernandez, M. Alejandra Canon, Isamar Reyes, Paola Villamarin



Chemical Control – Lab Evaluations Recap



Life Cycle



Tested Conventional Insecticides

#	Product Name	Active Ingredient	Group	Rate	Site	EPA Registration #
1	Timectin 0.15 EC	Abamectin	6	8 fl oz/100 gal	S, G, N	84229-1
2	Acephate 97 UP	Acephate	1B	8 oz/ 100 gal	G, N, L	70506-8
3	Talstar Nursery Flowable	Bifenthrin	3A	21.7 fl oz/ 100 gal	G, N, L	279-3206
4	Sevin SL	Carbaryl	1A	1 qt/ 100 gal	G, N, L	432-1227
5	Conserve SC	Spinosad	5	0.1 fl oz/ 1 gal	G, N, L	62719-291
6	Hachi-Hachi	Tolfenpyrad	21A	27 fl oz/ 100 gal	G, N, S, L	71711-31-67690
7	Mainspring GNL	Cyantraniliprole	28	8 fl oz/ 100 gal	G, N, I, L	10015-43
8	Azasol	Azadirachtin	Unknown	6 oz/ 50 gal	G, N, I, L	81899-4-74578
9	Xxpire	Sulfoxaflor-Spinetoram	4C-5	2.75 oz/ 100 gal	G, N	62719-676
10	Altus	Flupyradifurone	4D	14 fl oz/ 100 gal	G, N, L	432-1575
11	Rycar	Pyrifluquinazon	9B	3.2 fl oz/100 gal	G	71711-37-67690
12	Kontos	Spirotetramat	23	3.4 fl oz/ 100 gal	G, N, I	432-1471
13	Sarisa	Cyclaniliprole	28	27 fl oz/ 100 gal	G, N, S	71512-32-59807
14	Pradia	Cyclaniliprole-Flonicamid	28-29	17.5 fl oz/ 100 gal	G, N, S	71512-33-59807
15	Fulcrum	Pyriproxyfen	7C	12 fl oz/ 100 gal	G, N, L, S*	59807-14
16	Tristar	Acetamiprid	4A	25.3 fl oz/ 100 gal	G, N, S, L	8033-106-1001
17	Aria	Flonicamid	29	2.9 oz/ 100 gal	G, N, L	279-3287
18	Pedestal	Novaluron	15	8 fl oz/ 100 gal	G, N, S	53883-419-59807
19	Piston	Chlorfenapyr	13	10 fl oz/ 100 gal	G	91234-19
20	Overture	Pyridalyl	Unclassified	8 oz/ 100 gal	G	59639-125
21	Merit 75 WSP	Imidacloprid	4A	1.6 oz/300 gal	N, L, I	432-1318

S: shadehouse, G: greenhouse, N: nursery, L: landscape, I: interior, * Not for Gardenia and Schefflera

Tested Biorational Insecticides

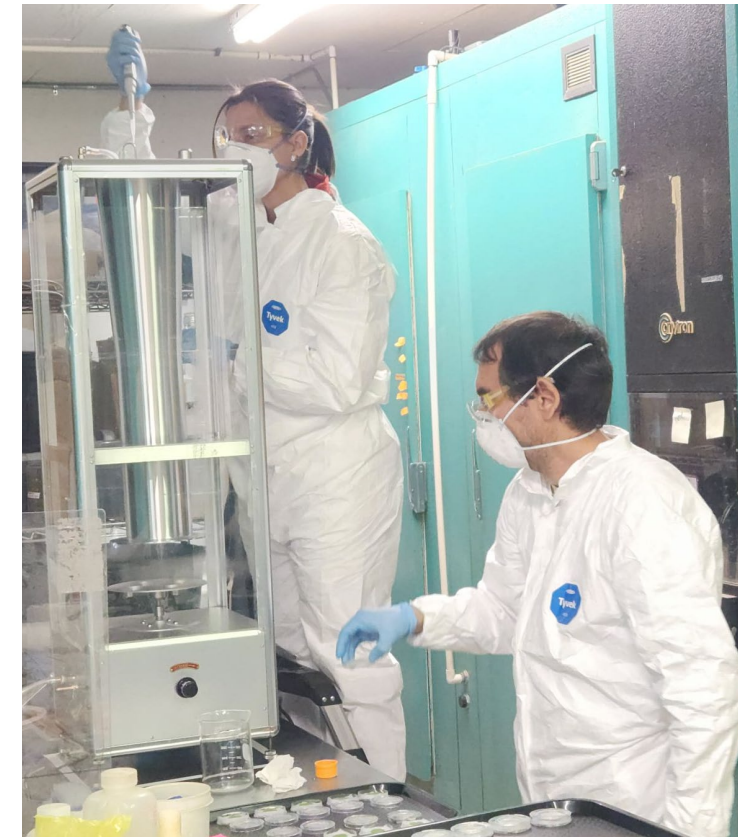
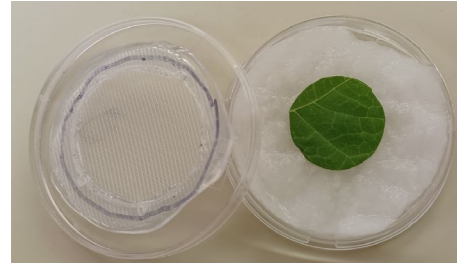
- Included horticultural oils and one insecticidal soap

#	Product Name	Active Ingredient	Group	Rate	Site	EPA Registration #
1	Agropest	Thyme + Rosemary oil	Unclassified	0.5%	S, G, N, L	FIFRA 25 (b) exempt
2	Thyme Guard	Thyme oil	Unclassified	0.5%	S, G, N, L	FIFRA 25 (b) exempt
3	Bee Safe 3-in-1	Sesame oil	Unclassified	3 fl oz/ 1 gal	S, G, N, L	FIFRA 25 (b) exempt
4	Nuke EM	Citric Acid	Unclassified	8 fl oz / 1 gal	S, G, N, L	FIFRA 25 (b) exempt
5	Bush doctor force of nature insect repellent	Garlic oil	Unclassified	128 fl oz/ 100 gal	S, G, N, L	FIFRA 25 (b) exempt
6	Sierra Natural Science 209	Rosemary oil	Unclassified	54 fl oz/ 50 gal	S, G, N, S	FIFRA 25 (b) exempt
7	Arte + Guard	<i>Artemisia afra</i> + Canola oil	Unclassified	1 fl oz/ 1 gal	G, N, I, L	FIFRA 25 (b) exempt
8	Styilet JMS	Paraffinic oil	Unclassified	1 fl oz/ 1 gal	G, N, I, L	65564-1
9	SuffoilX	Mineral oil	Unclassified	2%	G, N, L	48813-1-68539
10	Ultrafine	Mineral oil	Unclassified	3%	G, N, L, I	86330-11
11	M-Pede	Potassium salts of fatty acids	Unclassified	2.5 fl oz/1 gal	G, N, L, I	10163-324

S: shadehouse, G: greenhouse, N: nursery, L: landscape, I: interior

Lab Assays

- Bean leaf discs 24mm diameter
- Five L1, L2 or adults
- Treatment application :
 1. On the thrips (direct)
 2. On the plant (Residue toxicity)
- Mortality at 24h and 48h post treatment
- Feeding damage at 48h → Image J

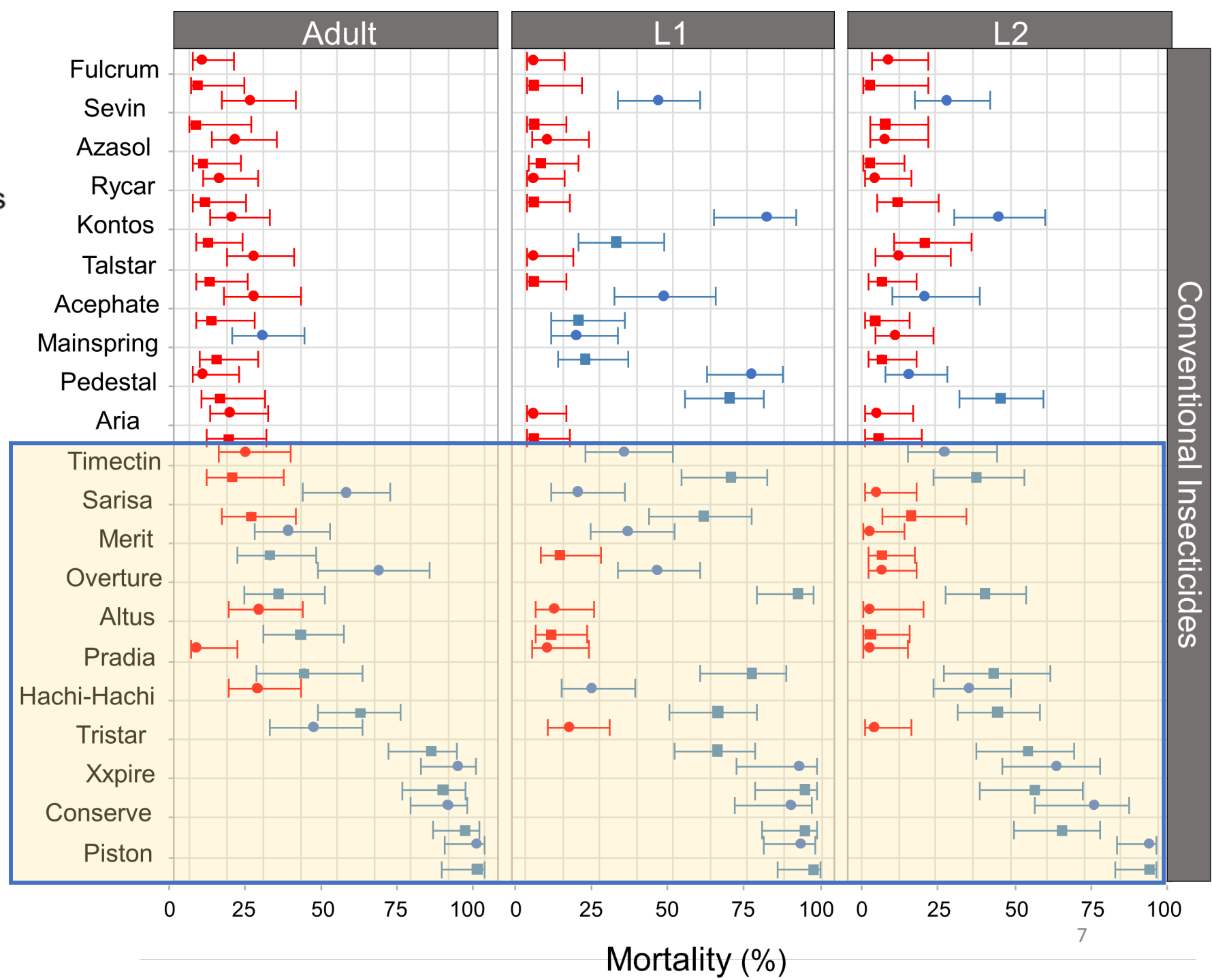


More Effective than Control: — $p \geq 0.05$
— $p < 0.05$

Application Method: ■ Direct Assays
● Residue Toxicity Assays

Ataide et al., 2024, *Insects* 15(1), 48

Thrips Mortality



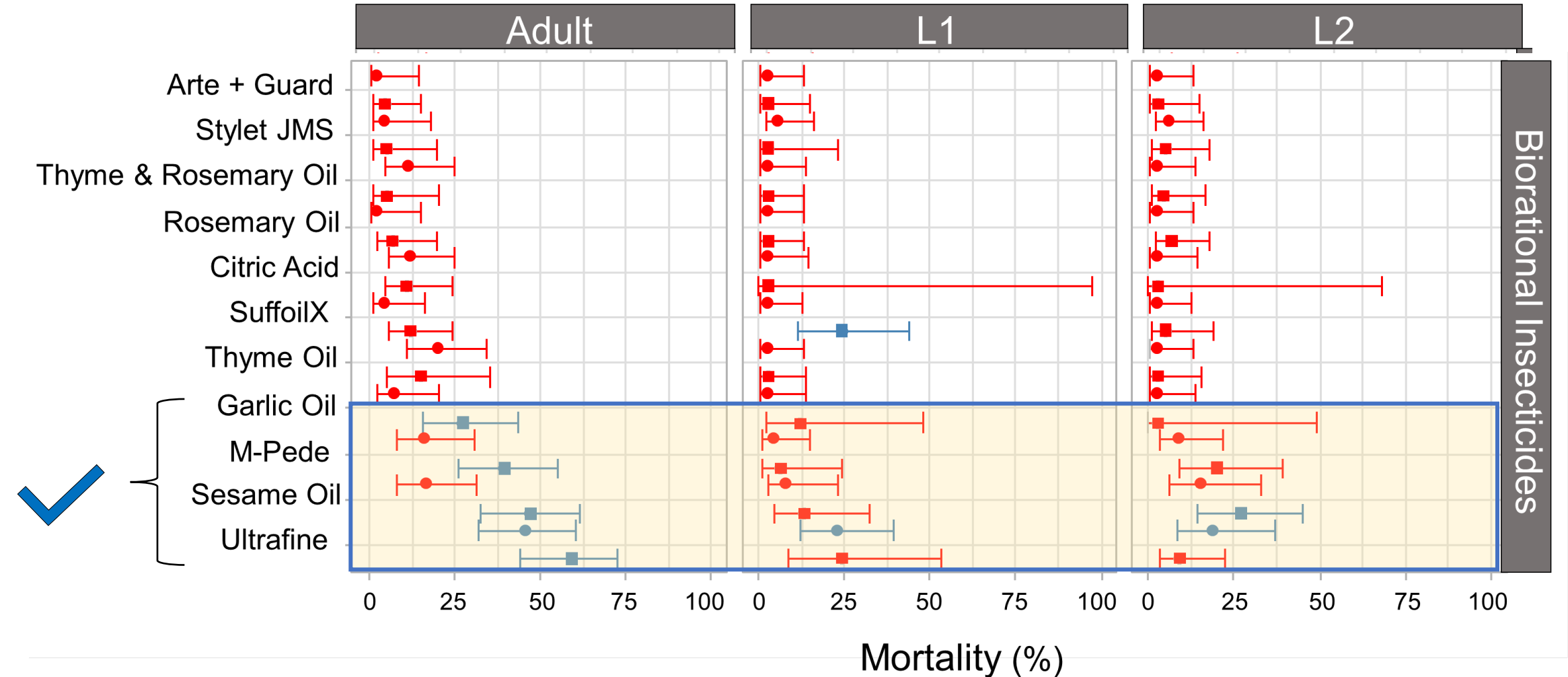
Conventional Insecticides

More Effective than Control:
— $p \geq 0.05$
— $p < 0.05$

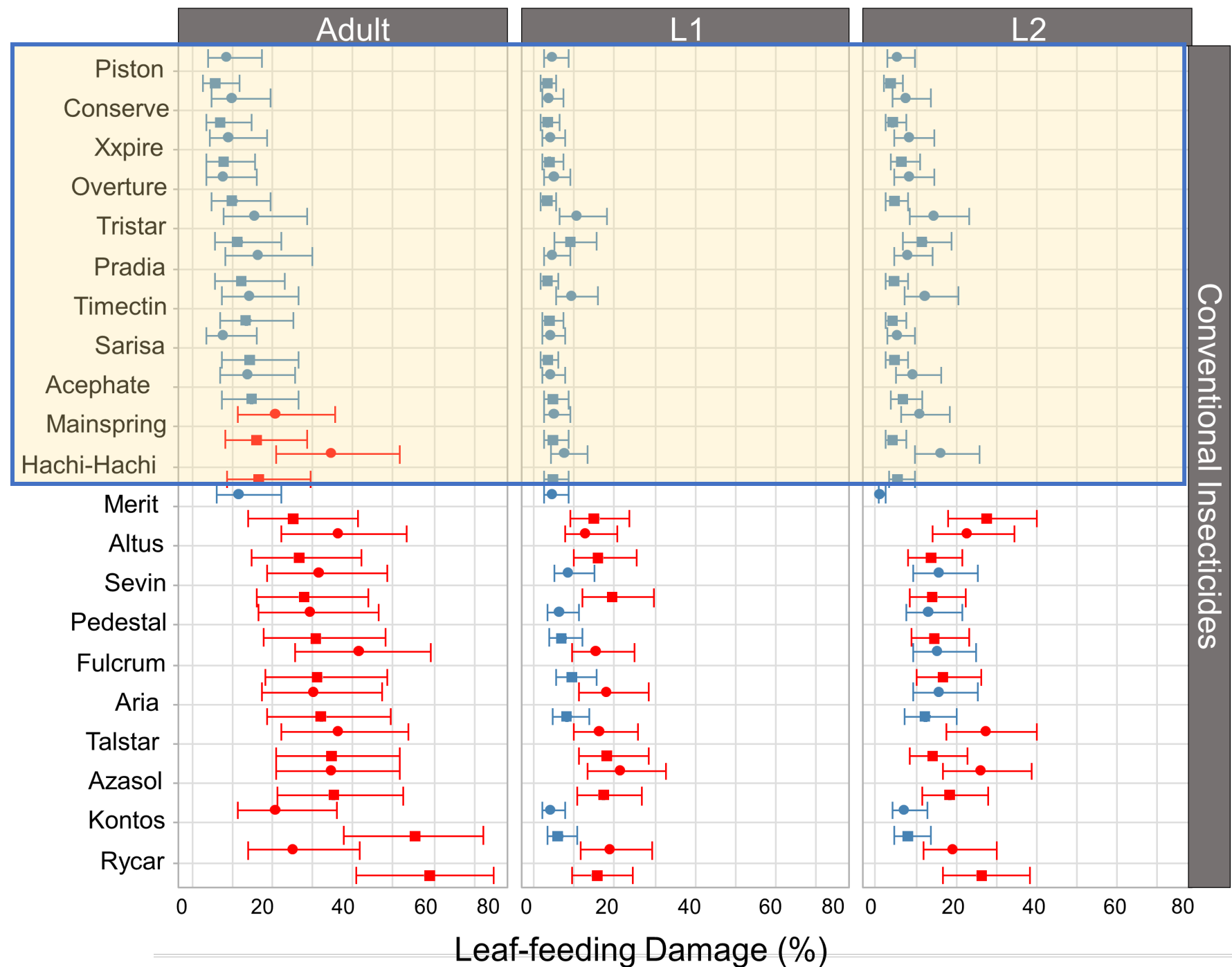
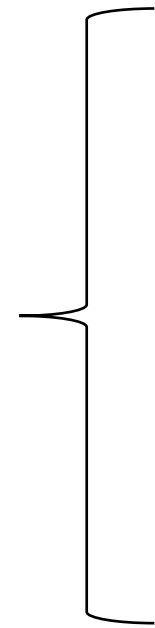
Application Method:
■ Direct Assays
● Residue Toxicity Assays

Thrips Mortality

Ataide et al., 2024, *Insects* 15(1), 48



Thrips Feeding Damage



Application Method:
 ■ Direct Assays
 ● Residue Toxicity Assays

More Effective than Control:
 — p ≥ 0.05 (Red)
 — p < 0.05 (Blue)

Ataide et al., 2024, *Insects* 15(1), 48

Conventional Insecticides

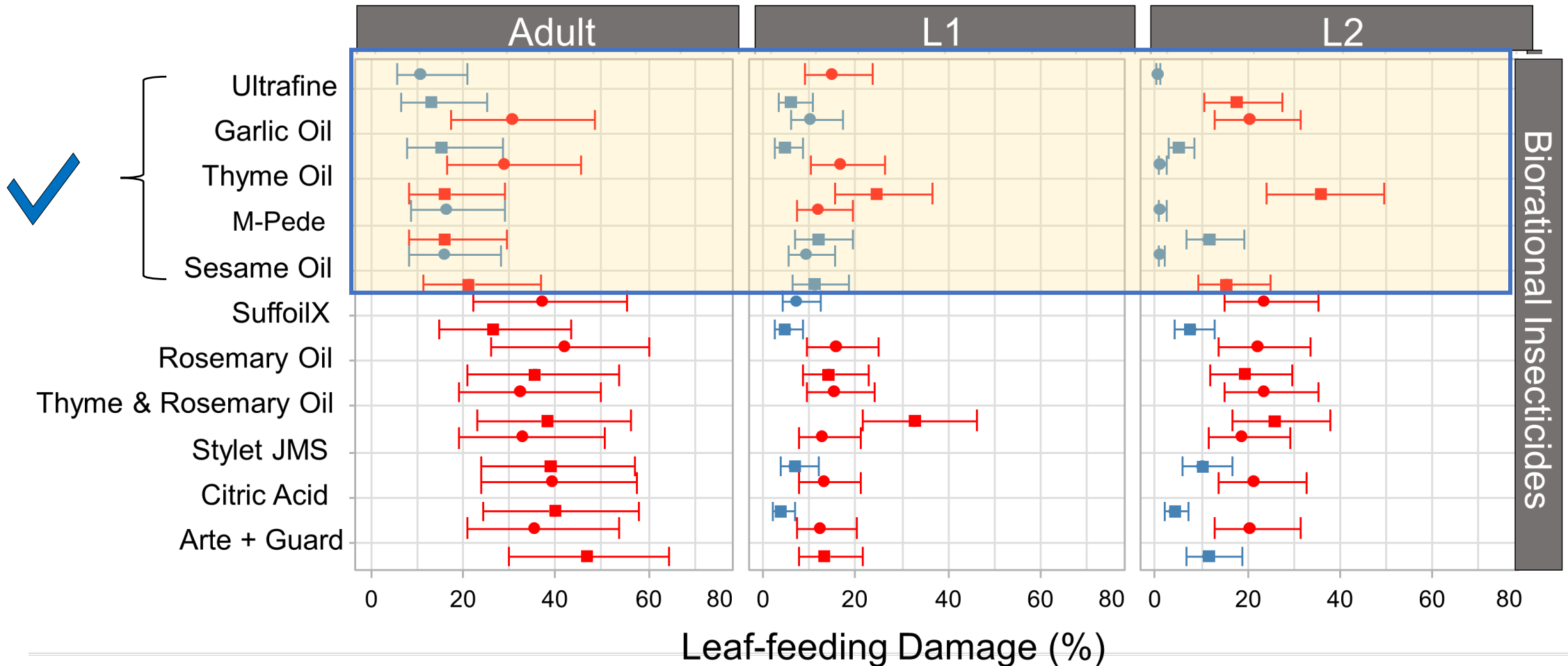
Leaf-feeding Damage (%)

More Effective than Control:
— $p \geq 0.05$
— $p < 0.05$

Application Method:
■ Direct Assays
● Residue Toxicity Assays

Thrips Feeding Damage

Ataide et al., 2024, *Insects* 15(1), 48



Overall Efficacy - Conventional Insecticides

Treatment	Group	L1 Direct	L1 Residue	L1 Feeding	L2 Direct	L2 Residue	L2 Feeding	Adult Direct	Adult Residue	Adult Feeding
Xpire	4C + 5	X	X	X	X	X	X	X	X	X
Conserve SC	5	X	X	X	X	X	X	X	X	X
Timectin	6	X	X	X	X	X	X			X
Piston	13	X	X	X	X	X	X	X	X	X
Pedestal	15	X	X	X	X	X				
Sarisa	28	X	X	X			X		X	X
Acephate	1B	X	X	X		X	X			X
Hachi-Hachi SC	21A	X	X	X	X	X	X	X		
Mainspring GNL	28	X	X	X			X		X	
Overture	Unclassified	X	X	X	X		X	X	X	X
Pradia	28 + 29	X		X		X	X	X		X
Tristar	4A	X		X	X		X	X	X	X

Overall Efficacy - Biorational Insecticides

Treatment	Active Ingredient	L1 Direct	L1 Residue	L1 Feeding	L2 Direct	L2 Residue	L2 Feeding	Adult Direct	Adult Residue	Adult Feeding
Bee Safe	Sesame oil			X	X		X	X		X
Thyme Guard	Thyme oil			X						
Bush doctor	Garlic oil	X		X						X
Suffoil-X	Mineral oil	X		X			X			
Ultrafine	Mineral oil		X			X	X	X	X	X
M-Pede	Potassium salts of fatty acids			X				X		X

Chemical Control – Greenhouse Evaluations



Tested Insecticides – Greenhouse Evaluations

#	Product Name	Active Ingredient	Group	Rate	Site	EPA Registration #
1	Piston	Chlorfenapyr	13	10 fl oz/ 100 gal	G	91234-19
2	Xxpire	Sulfoxaflor-Spinetoram	4C-5	2.75 oz/ 100 gal	G, N	62719-676
3	Conserve SC	Spinosad	5	0.1 fl oz/ 1 gal	G, N, L	62719-291
4	Overture	Pyridalyl	Unclassified	8 oz/ 100 gal	G	59639-125
5	Hachi-Hachi	Tolfenpyrad	21A	27 fl oz/ 100 gal	G, N, S, L	71711-31-67690
6	Timectin 0.15 EC	Abamectin	6	8 fl oz/100 gal	S, G, N	84229-1
7	Pradia	Cyclaniliprole-Flonicamid	28-29	17.5 fl oz/ 100 gal	G, N, S	71512-33-59807
8	Ultrafine	Mineral oil	Unclassified	3%	G, N, L, I	86330-11
9	Bee Safe 3-in-1	Sesame oil	Unclassified	3 fl oz/ 1 gal	S, G, N, L	FIFRA 25 (b) exempt

S: shadehouse, G: greenhouse, N: nursery, L: landscape, I: interior

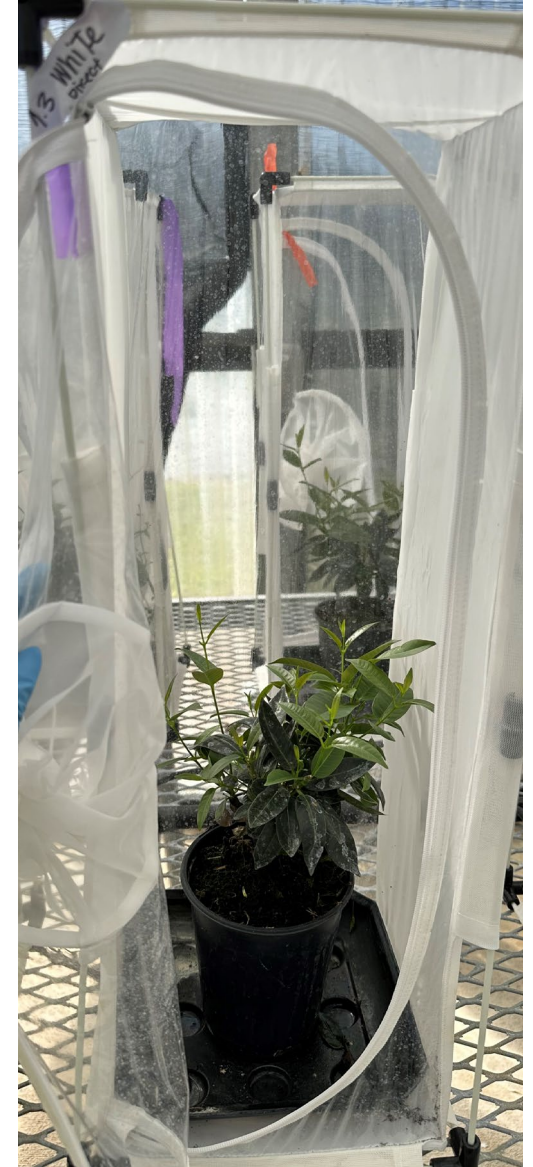
Greenhouse Evaluations (*In progress...*)

- Curative and prophylactic spray
- Water control
- 6 plants/ treatment/spray type
- Total 120 Mandevilla plants/trial
- Two trials with a total of 240 plants
- Red (Scarlet), White (Chevy)



Greenhouse Evaluations - Curative

- Release 10 L2 and 10 adult thrips
- Establish for 2 weeks
- Apply treatment
- Collect 3 leaves (bottom, middle, top) at 24h, 7 & 14 days post treatment application
- Non-destructive sampling



Greenhouse Evaluations – Prophylactic

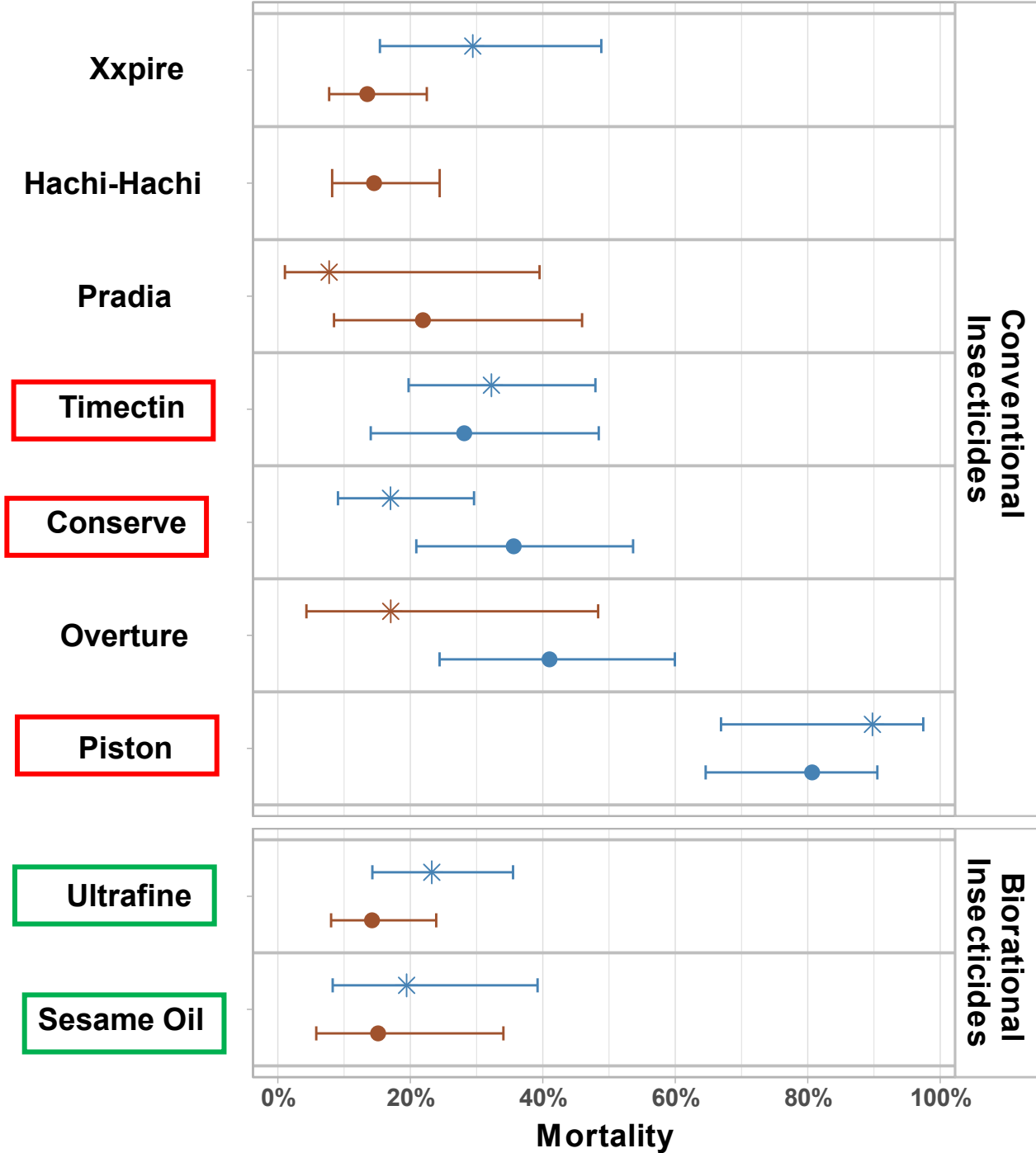
- Apply treatment
- 24h later release 10 L2 and 10 adult thrips
- Collect 3 leaves (bottom, middle, top) at 24h, 7 & 14 days post thrips release
- Non-destructive sampling



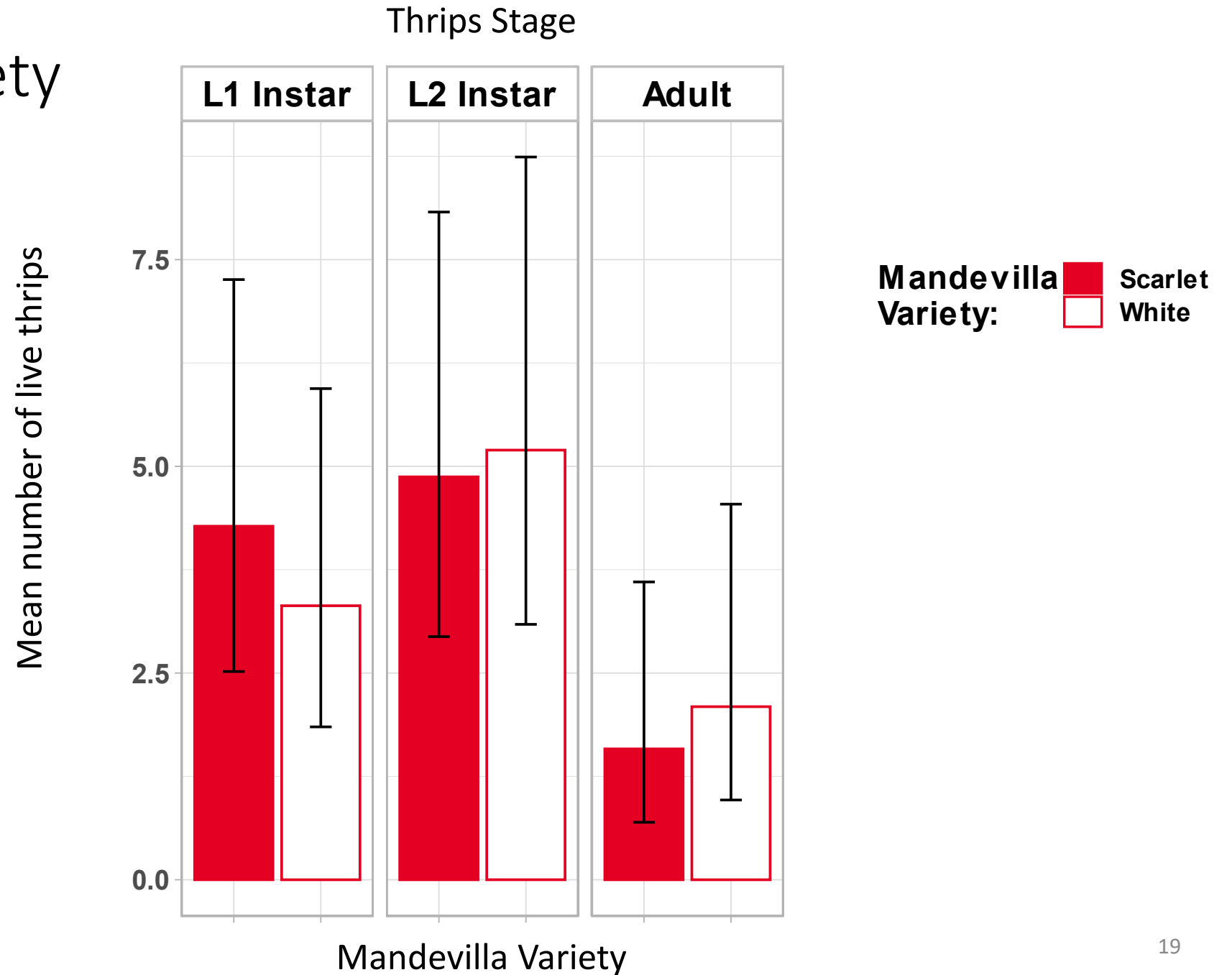
Thrips Mortality

More Effective Than Control: ● $p \geq 0.05$
 ● $p < 0.05$

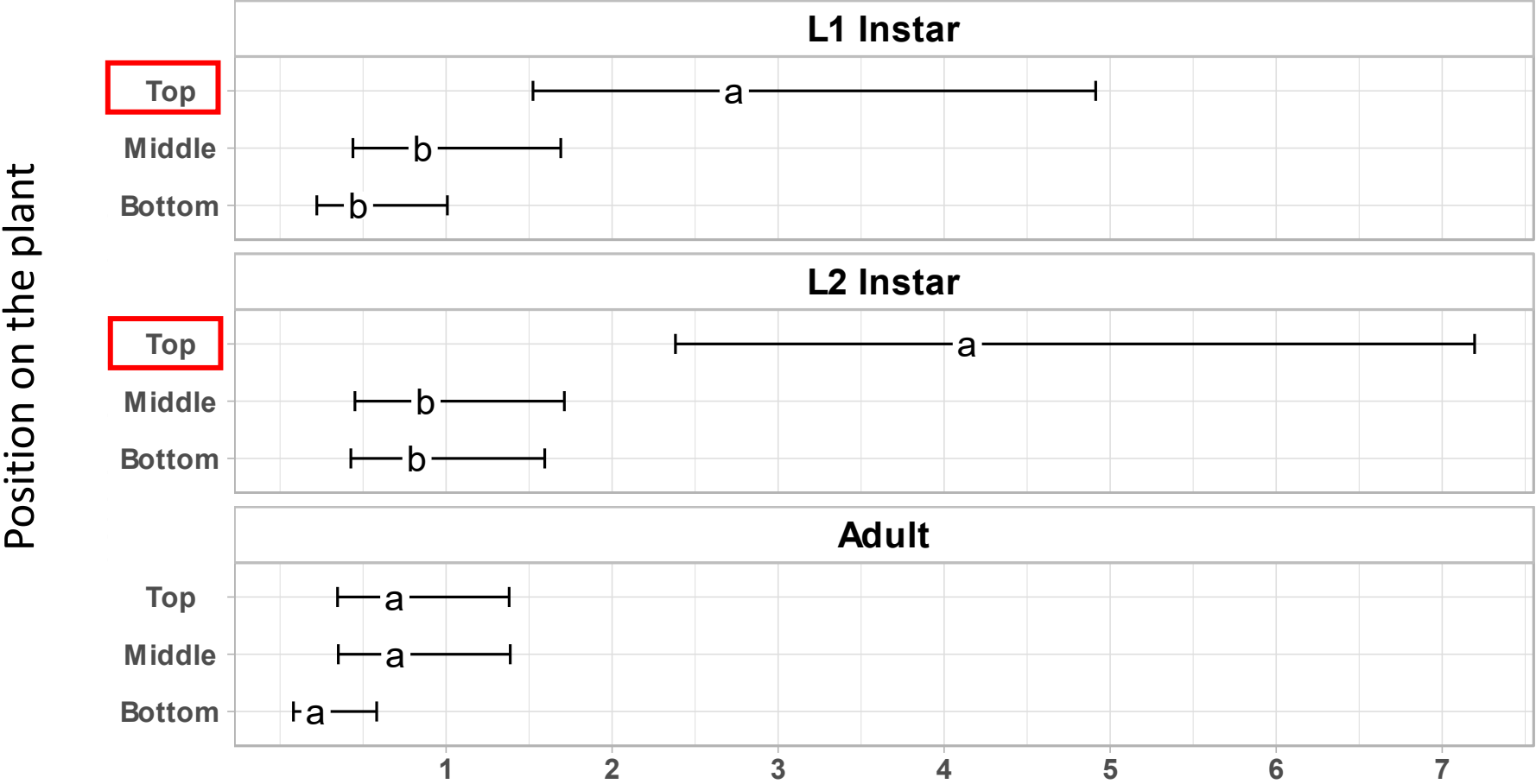
Application Method
 ● Curative
 ✱ Prophylactic



Mandevilla Variety



Thrips Position on the Canopy



Conclusions – Chemical Control

- At least 12 conventional and 3 biorational insecticides show potential
- Greenhouse evaluations validate lab results for the most efficacious active ingredients
- Mineral and sesame oils cause significant mortality when applied preventatively
- Infestation level similar for both Mandevilla varieties
- Thrips target primarily the upper part of canopy

Actions to Avoid Resistance

- Implement multiple control methods → IPM
- Chemical control applications alone will exacerbate the problem!
- Rotate products with active ingredients that belong to different IRAC groups
- Do not apply back-to-back products that share an active ingredient of the same IRAC group, i.e. Xxpire and Conserve, Pradia and Mainspring





Overall Efficacy - Conventional Insecticides

Treatment	Group	L1 Direct	L1 Residue	L1 Feeding	L2 Direct	L2 Residue	L2 Feeding	Adult Direct	Adult Residue	Adult Feeding
Xpire	4C + 5	X	X	X	X	X	X	X	X	X
Conserve SC	5	X	X	X	X	X	X	X	X	X
Timectin	6	X	X	X	X	X	X			X
Piston	13	X	X	X	X	X	X	X	X	X
Pedestal	15	X	X	X	X	X				
Sarisa	28	X	X	X			X		X	X
Acephate	1B	X	X	X		X	X			X
Hachi-Hachi SC	21A	X	X	X	X	X	X	X		
Mainspring GNL	28	X	X	X			X		X	
Overture	Unclassified	X	X	X	X		X	X	X	X
Pradia	28 + 29	X		X		X	X	X		X
Tristar	4A	X		X	X		X	X	X	X

Resources

Article

Efficacy of Conventional and Biorational Insecticides against the Invasive Pest *Thrips parvispinus* (Thysanoptera: Thripidae) under Containment Conditions

Livia M. S. Ataide ^{1,*}, German Vargas ², Yisell Velazquez-Hernandez ¹, Isamar Reyes-Arauz ¹, Paola Villamarin ¹, Maria A. Canon ¹, Xiangbing Yang ³, Simon S. Riley ⁴ and Alexandra M. Revynthi ^{1,*}

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Thrips parvispinus



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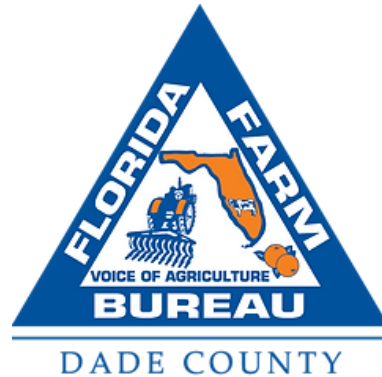


Thank You!

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