Root knot nematode and southern blight management projects in Kern County

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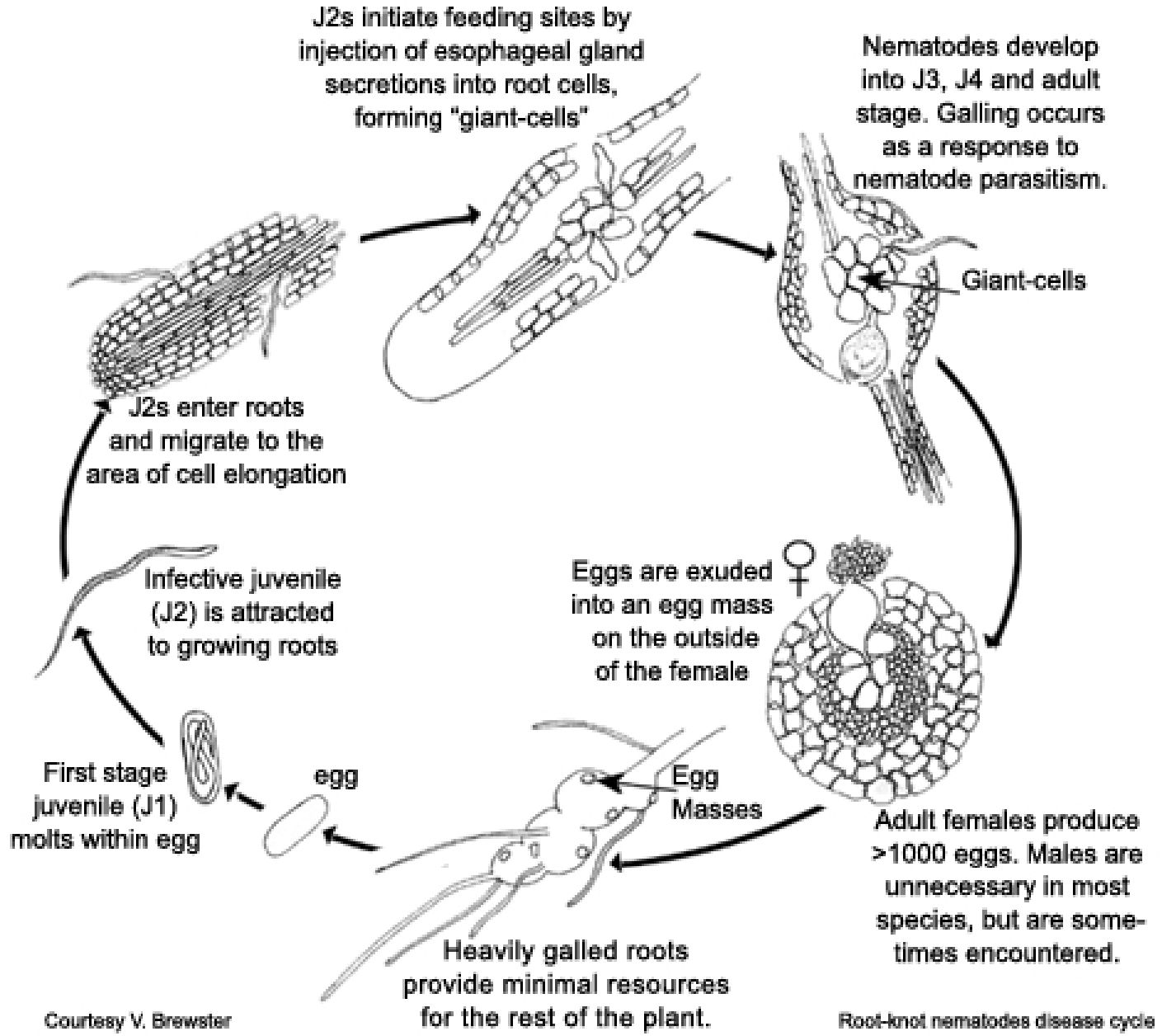
RKN Introduction

- Root knot nematodes, *Meloidogyn*e spp. : most important plant parasitic nematodes
- Species of *Meloidogyne* present in California; *M. incognita*, *M. hapla*, *M. javanica* and *M. arenaria*
- Widespread throughout warm regions, light texture soils

Symptoms

- Generally root galling
- Above-ground symptoms: stunted and less vigorous plants, wilting yellowing etc.
- Roots unable to sustain the water and nutrients needs
- Reduced yield and poor fruit quality
- Vulnerable to other soil-borne pathogens

Life Cycle: Temperature driven



Challenges in management

- Wide host range
- Mi gene resistance in tomato cultivars: Breakdown instances
- Management relied on pre-plant fumigation
- New fumigant regulations by Department of Pesticide Regulation (DPR)
    - limits the amount used by a grower
    - caps on the amounts allowed in a township
    - expanded buffer zones

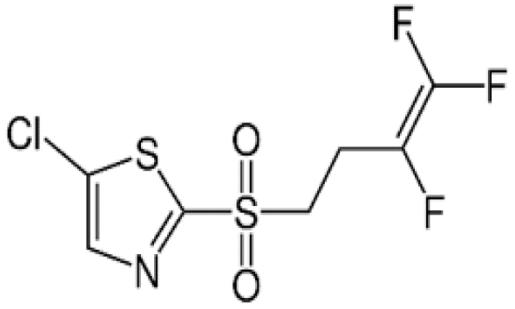
Objective

To evaluate alternative non-fumigant nematicides for managing RKN

- high efficacy
- economically viable
- environmentally safe

Product	AI	Manufacturer
Nimitz	Fluensulfone	Adama
Velum	Fluopyram	Bayer
Salibro	Fluazaindolizine	Corteva
Developmental product	----- Conventional----	Syngenta
Organic products		

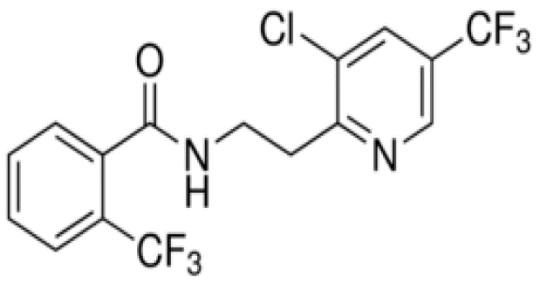
Nimitz (Adama)



Fluensulfone

Caution

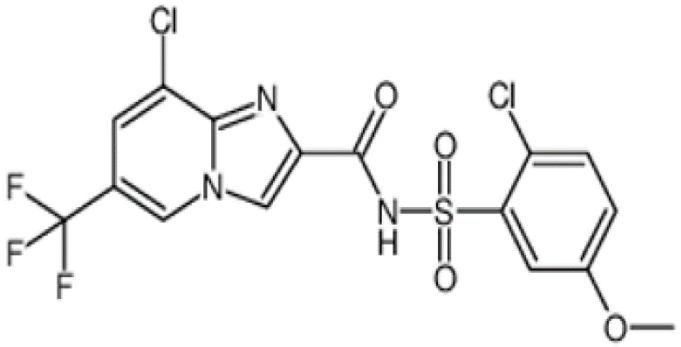
Velum(Bayer)



Fluopyram

Caution

Salibro (Corteva)



Fluazaindolizine

Caution

DP

"?"

New products are less toxic, more selective, and Safer to use – true nematicides

Modes of action – New or unknown

Trials in 2019- 2021

The trials are done at the research farm with *M. incognita* being the main RKN present there.

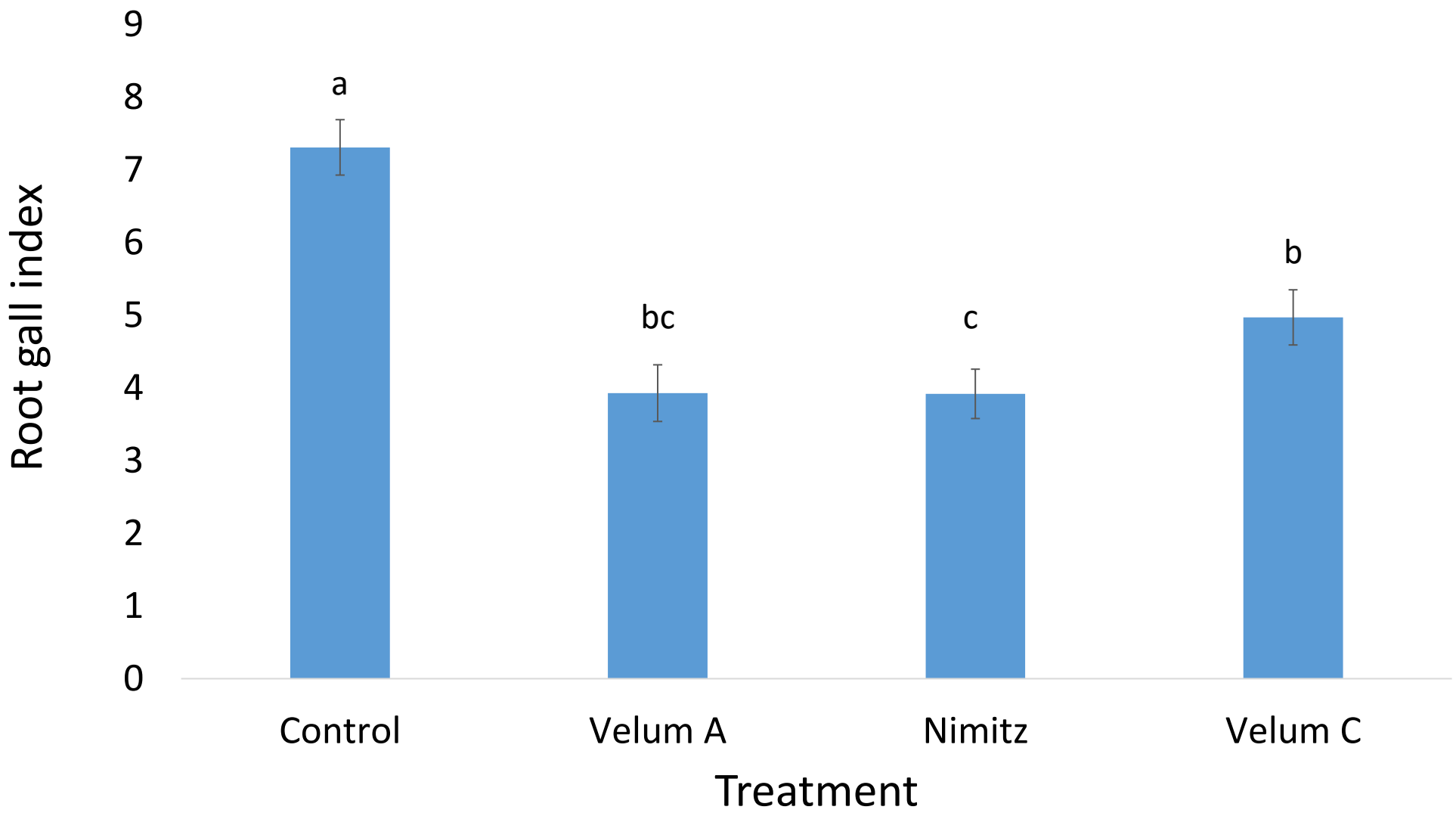
Trial details

- Small plot field trial, 60” beds, 20 feet plots with a 2 feet buffer between plots
- Tomato variety ‘Halley’ hand transplanted
- Four replications
- Four treatments in 2019, six in 2020 & seven treatments in 2021
- Treatments applied either as a pre or post-plant as soil drench
- Surface drip irrigation
- Root galling index: 0-10 (0= no visible galls 10 extensive galling)

2019 Treatments

Trt no.	Trt	Application Timing	Rate /Acre
1	Control		
2	Velum	5 days after planting	6.5 Oz/ A
3	Nimitz	At planting	5 pt/ A
4	Velum	2 weeks after planting	6.5 Oz/ A

2019 Galling on tomato roots caused by root knot nematode



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Control

Nimitz

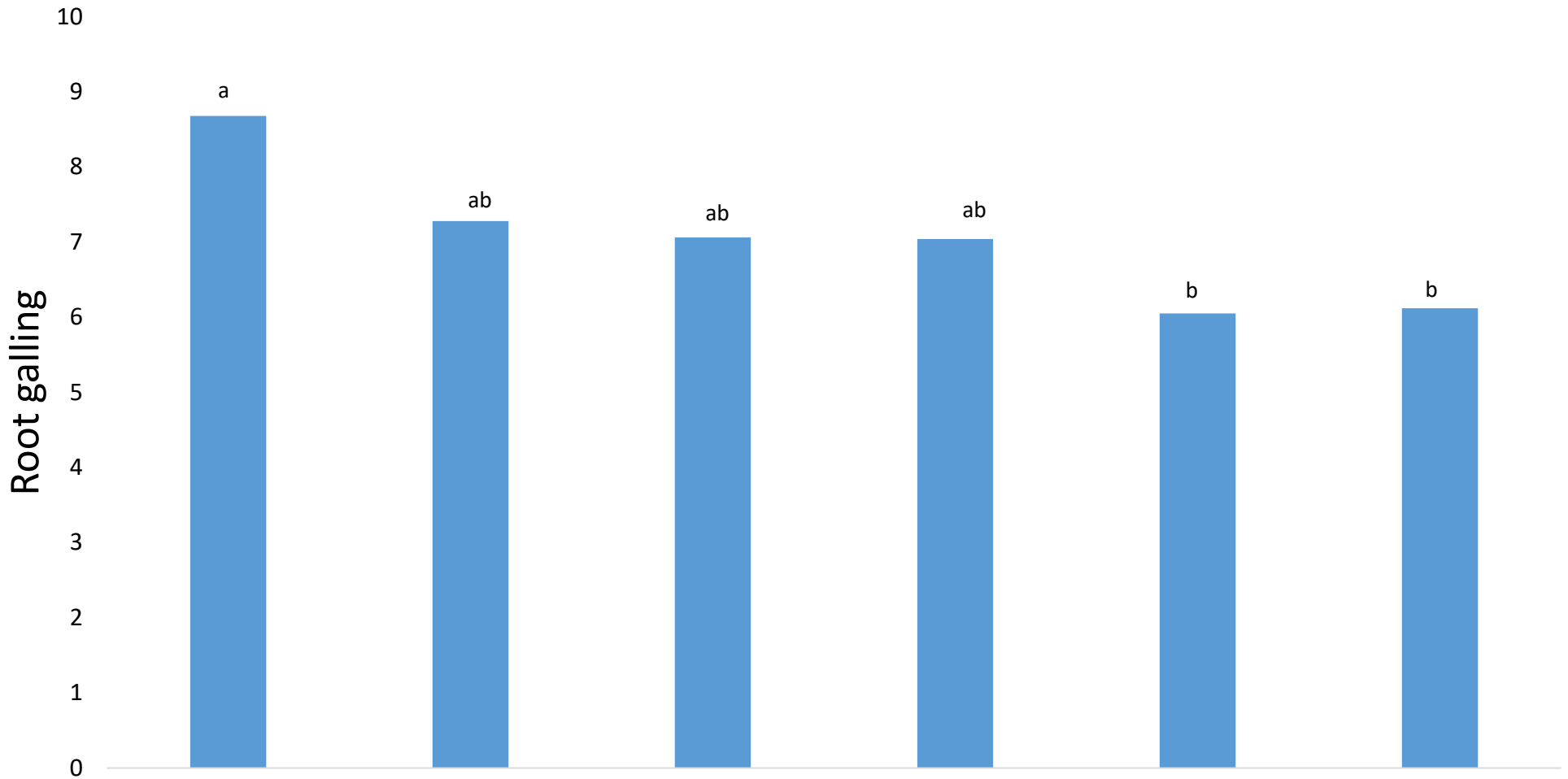
Nimitz

Velum C

2020 Treatments

Trt no.	Trt	Application time	Rate /Acre
1	Control		
2	Velum	At planting	6.5 Oz/ A
3	Nimitz	At planting	5 pt/ A
4	Salibro	At planting, 28 d after planting	30.7 fl oz/A
5	Calcium cyanamide	At planting, Soil incorporated	200lbs/ A
6	DP1	At planting	11.4 fl oz/ A

Galling on tomato roots caused by nematodes



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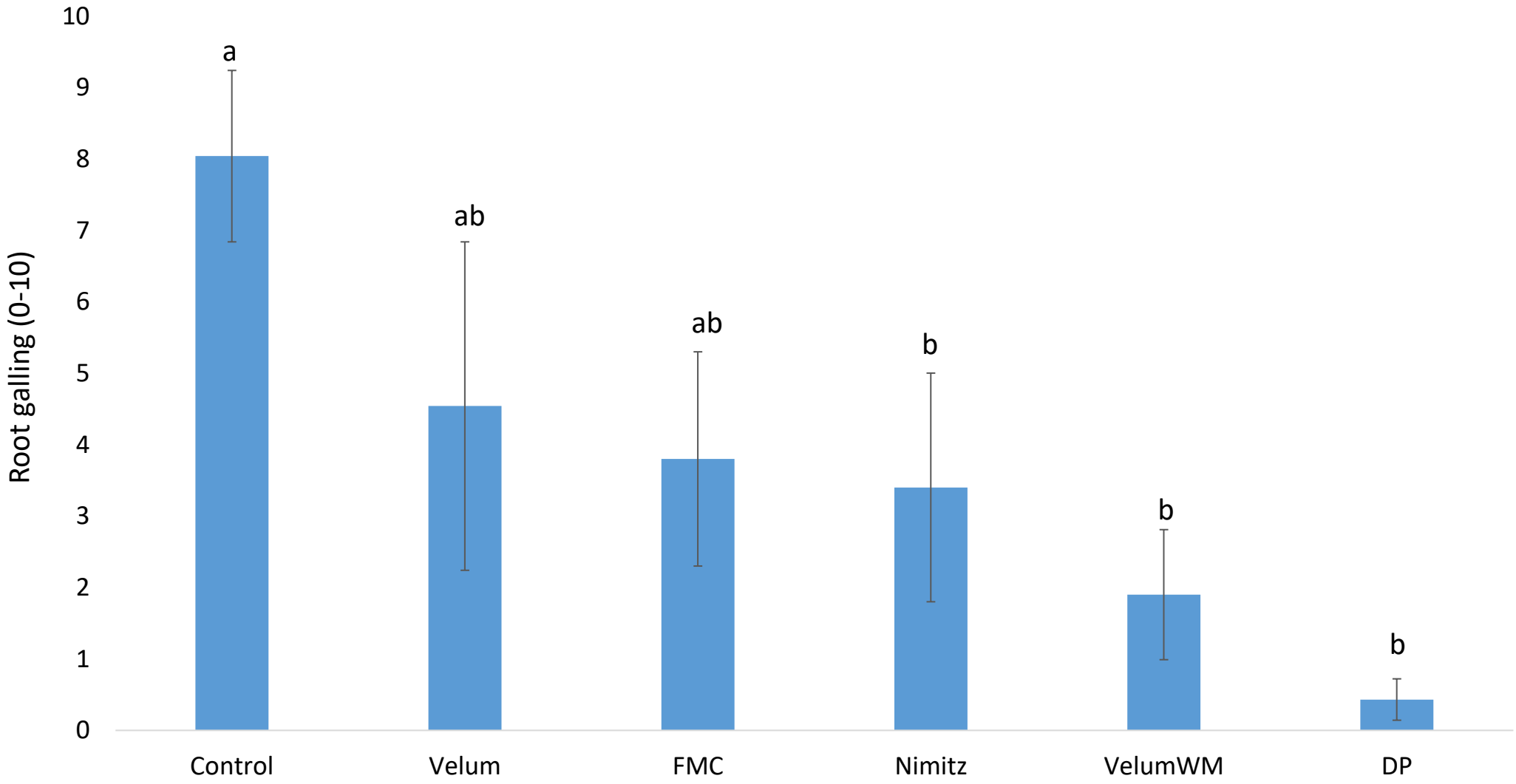
2021 Treatments

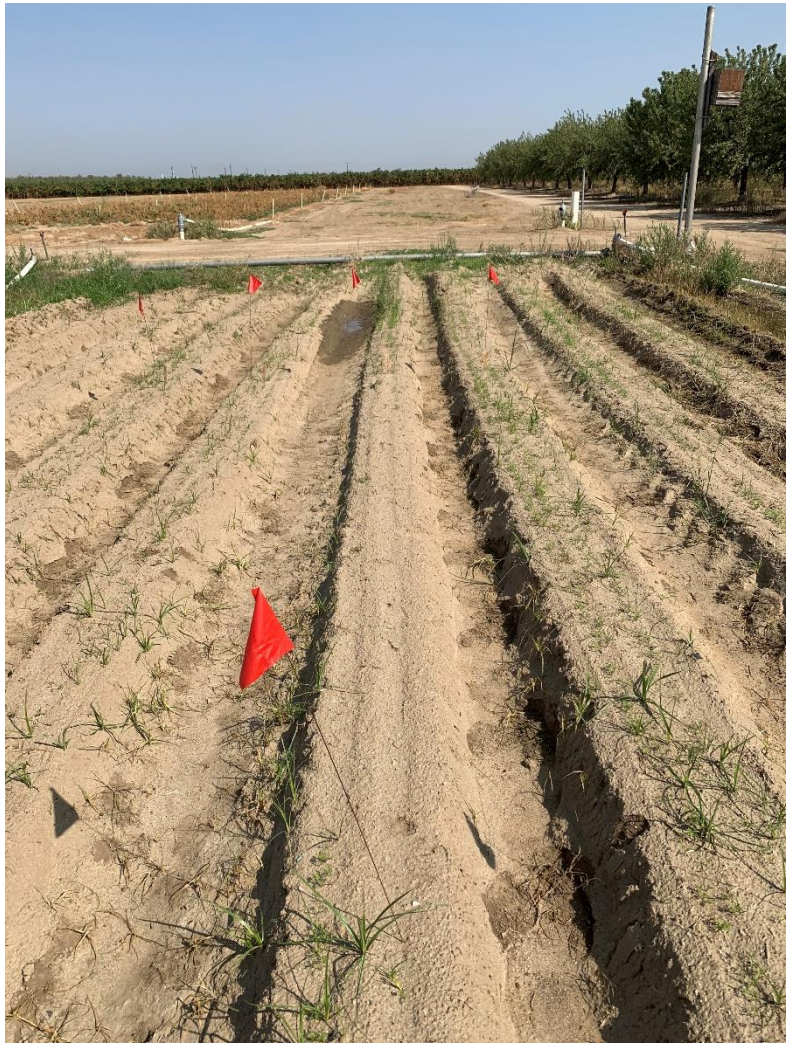
Trt no.	Trt	Application timing	Rate /Acre
1	Control		
2	Velum	At planting	6.5 Oz/ A
3	Velum +Watermaxx2	At planting	6.5 Oz/ A 2 qtz/ A
4	Nimitz	At planting	5 pt/ A
5	FMC	At planting, 30, and 60 DAP	1L/ ha
7	DP1	At planting	11.4 fl oz/ A

2021 galling on tomato roots caused by root knot nematode



1= Control 3= Velum+WM 4= Nimitz 7= DP

Nutsedge control



Conclusion

- Nimitz continued to show excellent performance. Only CAUTION label, no reentry interval. Also expected to be registered on other crops in CA.
- Velum appeared to provide good protection against RKN in these trials but further optimization needed for velum applications.
- DP showed good potential in these trials; registration status???

Next-generation non-fumigant nematicides will continue to be the main nematode-control method evaluated/applied in the high-value crops.

Southern Blight

- Soil borne fungal disease
- Caused by *Sclerotium rolfsii*
- Historically a concern in Kern county
- Now an emerging concern in northern California
- High temperatures, high soil moisture, and frequent irrigation
- High probability of it being a concern in future

Management- difficult

- Deep plowing not an option
- Difficult to apply fungicides at the base of the plant
- Crop rotation not an option- wide host range
- Fumigation: expensive and regulatory issues
- Grafted transplants not economically feasible

Field Trials

- On research farm and Grower's field
- Replicated block design with four reps
- Evaluate disease incidence: symptoms and mortality……
- Data on marketable yield

2021 On farm

60” wide 20 ft plots, 4 reps

Treatment	Rate	Application type and date of application
Control		
Fontelis	24 fl Oz/ A	Soil Drench 05/05/21, 05/26/21
Pyraziflumid	3.2 fl oz/ A	Soil Drench 05/05/21, 05/26/21

2021

Trt#	Treatment	Percent Incidence	Total Yield (tons/ A)
1	Control	10.48	13.56
2	Fontelis	8.42	12.63
3	Pyraziflumid	20.08	10.90
	P value	0.63	0.90

2022 Field Trial

60” wide, 30 ft plots, 5 reps

Trt#	Treatment	Percent Incidence	Marketable yield (tons/A)
1	Control	38.47	10.35
2	Fontelis	36.75	15.23
3	Pyraziflumid	34.14	11.89
	P value	0.92	0.62

2022 Field Trial Valent

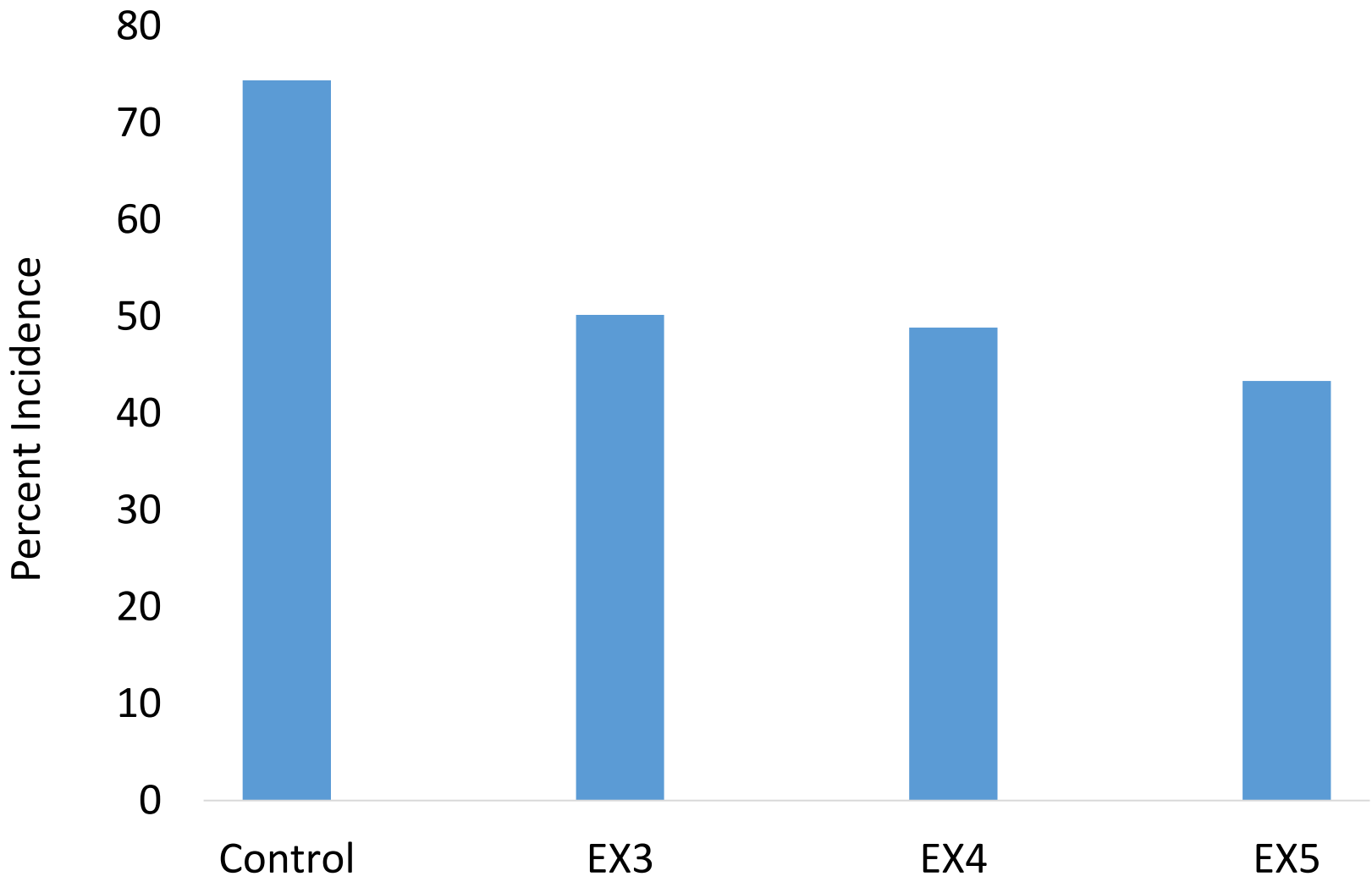
60” wide, 30 ft plots, 5 reps

	Trt	Application time/date	Rate/A
1	Control		
3	Excalia3	At planting 30 DAP	4floz/ a 2fl oz/a
4	Excalia4	At planting 45 DAP	4floz/ a 2fl oz/a
5	Excalia5	At planting 70 DAP	4floz/ a 2fl oz/a

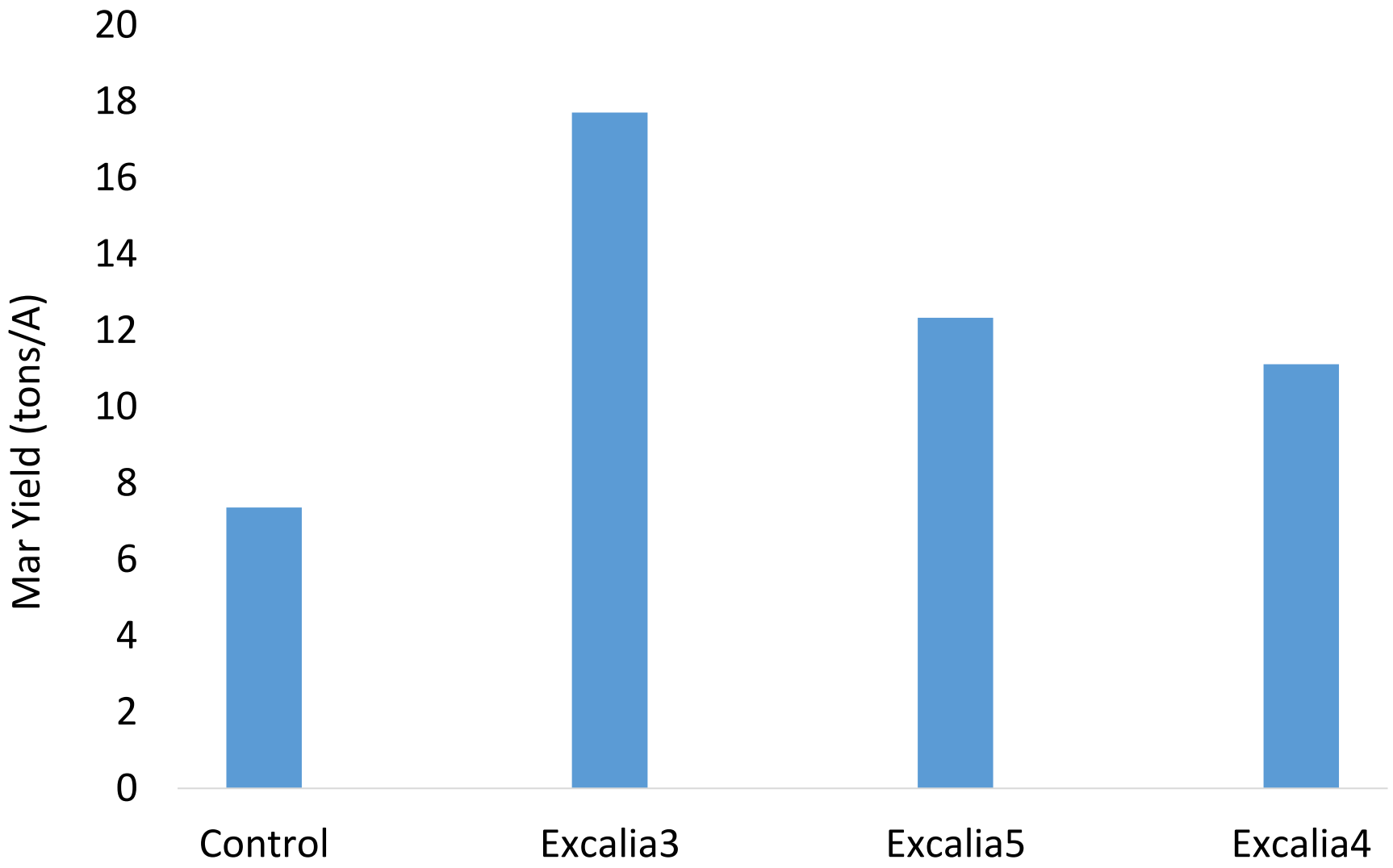
Volume at transplanting: 500G/A

Subsequent applications: 70 G/A

Excalia Trial



Excalia Trial



2023 Trial

Challenging year

NO DISEASE OBSERVED!!!

Plan 2024

- Field trials for RKN and SB management
- Testing any other new products in the market

Acknowledgements

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Thank you

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