

Injection of Pest Control Materials into SDI

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Overview

- Opportunities and Limitations
- Pest control materials that are being used or may have promise injected into SDI
- Select trials

Advantages of SDI over Ground or Aerial Applications

- Eliminate drift
- Eliminate exposure of workers to materials on plant surfaces
- Eliminates direct exposure to beneficial insects
- Convenient
 - less disruptive to other activities in the field
 - not influenced by high winds or light rains
- Cost effective

Properties Influencing Pesticide Activity Through SDI Systems

- Water solubility
- Movement in plant
- General efficacy against target

Some materials discussed may not be registered on tomatoes. All applicable labels should be read before writing a pesticide recommendation.

Fungicides

Phytophthora, Pythium

- Ridomil Gold
- Potassium Phosphite, which has many trade names
- Previcur Flex

Other Soil-borne pathogens

- Cannonball
- Quadris
- Folicur, Orius, Tebuzol

Insecticides Demonstrating Promise in SDI systems

- Neonicotinoids: Admire, Platinum, Venom
(flea beetle, cucumber beetle, aphid,
leafhopper, whitefly)
- Diamides: Coragen, Synapse
(worms, whitefly, aphid)
- Carbamate: Vydate
(broad activity on insecticides, some
nematode control)

Water Solubility

(relative to least soluble insecticide listed)

- Coragen *Highly insoluble (0.001 g/L)*
- AdmirePro 580 x more soluble than Coragen
- Platinum 4,100 x
- Venom 39,830 x
- Vydate 229,000 x

Materials with low solubility are not likely to move up in the soil profile.

Materials with high solubility are more likely to leach.

Evaluation of SDI-Injected Fungicides for Control of *Monosporascus* Root Rot



Methods

root evaluations

- Twenty root systems were dug from each plot on 16 July.
- In the laboratory, each root system was rated for root rot (1-4)



Cannonball (4 oz/acre) or Topsin-M (10 oz/acre) applied at 4, 8 and 12 weeks after planting in Spring-planted cantaloupes in 2005 and 2006 at Desert Research and Extension Center, Holtville, CA.

Treatment	severity (1-4)	
	2005	2006
Cannonball	1.40 b	1.50 b ^z
Topsin-M	2.40 a	2.42 a
Untreated control	2.90 a	2.75 a

Cannonball (4 oz/acre) application timing on root rot severity in Fall-plated cantaloupes cv. Impac in 2005 at Desert Research and Extension Center, Holtville, CA.

Treatment	severity (1-4)
one application of Cannonball – 7 days after first irrigation	2.512 b ^z
two applications of Cannonball – 7 and 28 days after first irrigation	2.149 b
three applications of Cannonball – 7, 28 and 46 days after first irrigation	2.241 b
Untreated control	3.185 a

Evaluation of Fungicide Programs Including Drip-Applied Materials for White Rot Control in Garlic



Sclerotia



At Planting Treatments

- 1 Folicur 20.5 oz
- 2 Cannonball 8.0 oz
- 3 Contans 4 lbs/a
- 4 Cannonball 8.0 oz + Botran 5F 102 oz
- 5 Untreated control

Drip Applied Treatments

	Application dates		
	15 Feb	7 Mar	27 Mar
1	Cannonball 8.0oz	Folicur 20.5 oz	
2	Cannonball 8.0oz	Folicur 20.5 oz	Endura 6.8 oz
3	Folicur 20.5 oz	Cannonball 8.0oz	Endura 6.8 oz
4	Untreated control		

Five Replication Split-Plot Experimental Design

	REP 1				REP 2				REP 3				REP 4				REP 5			
-10'	Drip 4	Drip 2	Drip 1	Drip 3	Drip 4	Drip 1	Drip 3	Drip 2	Drip 3	Drip 2	Drip 1	Drip 4	Drip 1	Drip 3	Drip 4	Drip 2	Drip 4	Drip 1	Drip 3	Drip 2
	IF 5	IF 3	IF 2	IF 3	IF 5	IF 4	IF 2	IF 3	IF 5	IF 1	IF 4	IF 5	IF 2	IF 5	IF 4	IF 1	IF 2	IF 3	IF 1	IF 4
	IF 2	IF 5	IF 4	IF 2	IF 3	IF 1	IF 5	IF 1	IF 3	IF 4	IF 2	IF 4	IF 5	IF 2	IF 3	IF 5	IF 4	IF 4	IF 2	IF 5
	IF 4	IF 2	IF 1	IF 5	IF 2	IF 2	IF 3	IF 5	IF 1	IF 3	IF 3	IF 2	IF 3	IF 4	IF 5	IF 3	IF 1	IF 5	IF 4	IF 1
	IF 1	IF 4	IF 3	IF 4	IF 4	IF 3	IF 1	IF 4	IF 2	IF 2	IF 1	IF 1	IF 4	IF 3	IF 1	IF 4	IF 5	IF 1	IF 3	IF 2
	IF 3	IF 1	IF 5	IF 1	IF 1	IF 5	IF 4	IF 2	IF 4	IF 5	IF 5	IF 3	IF 1	IF 1	IF 2	IF 2	IF 3	IF 2	IF 5	IF 3
-10'	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	23

Drip Injection System



Garlic Clove Collection and Incubation

The background of the slide is a photograph of several garlic cloves with their roots, arranged on a black wire mesh. The cloves are light brown and the roots are thin and fibrous. The entire scene is overlaid with a semi-transparent green rectangular box that contains the title and text.

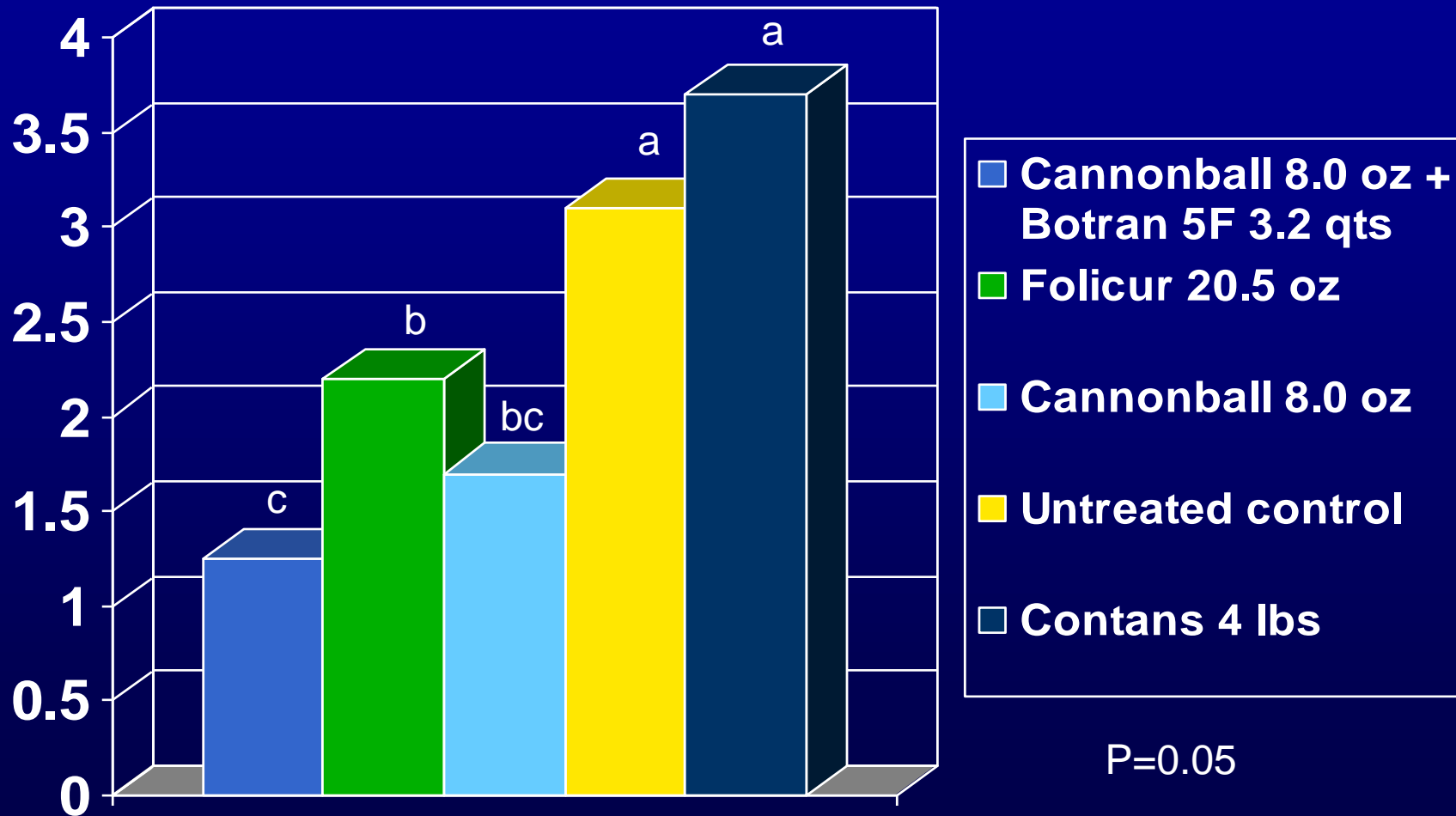
- 7 Feb collection 2008: *S. cepivorum* grew from 2/50 cloves
- 7 Feb collection 2009: *S. cepivorum* grew from 1/50 cloves

20 Apr 2008



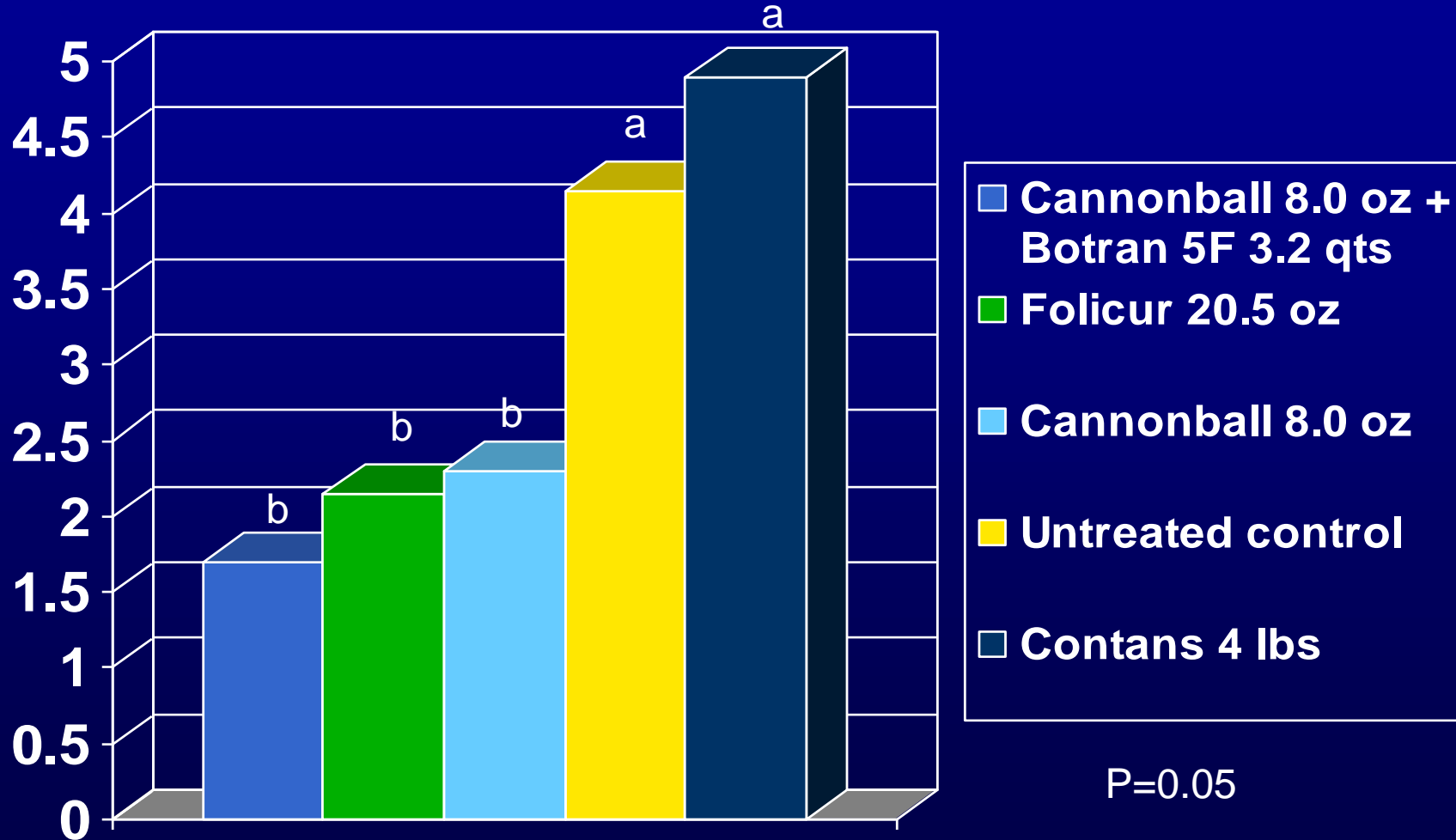
Programs Trial: In furrow

Above-ground symptom severity, 23 Apr



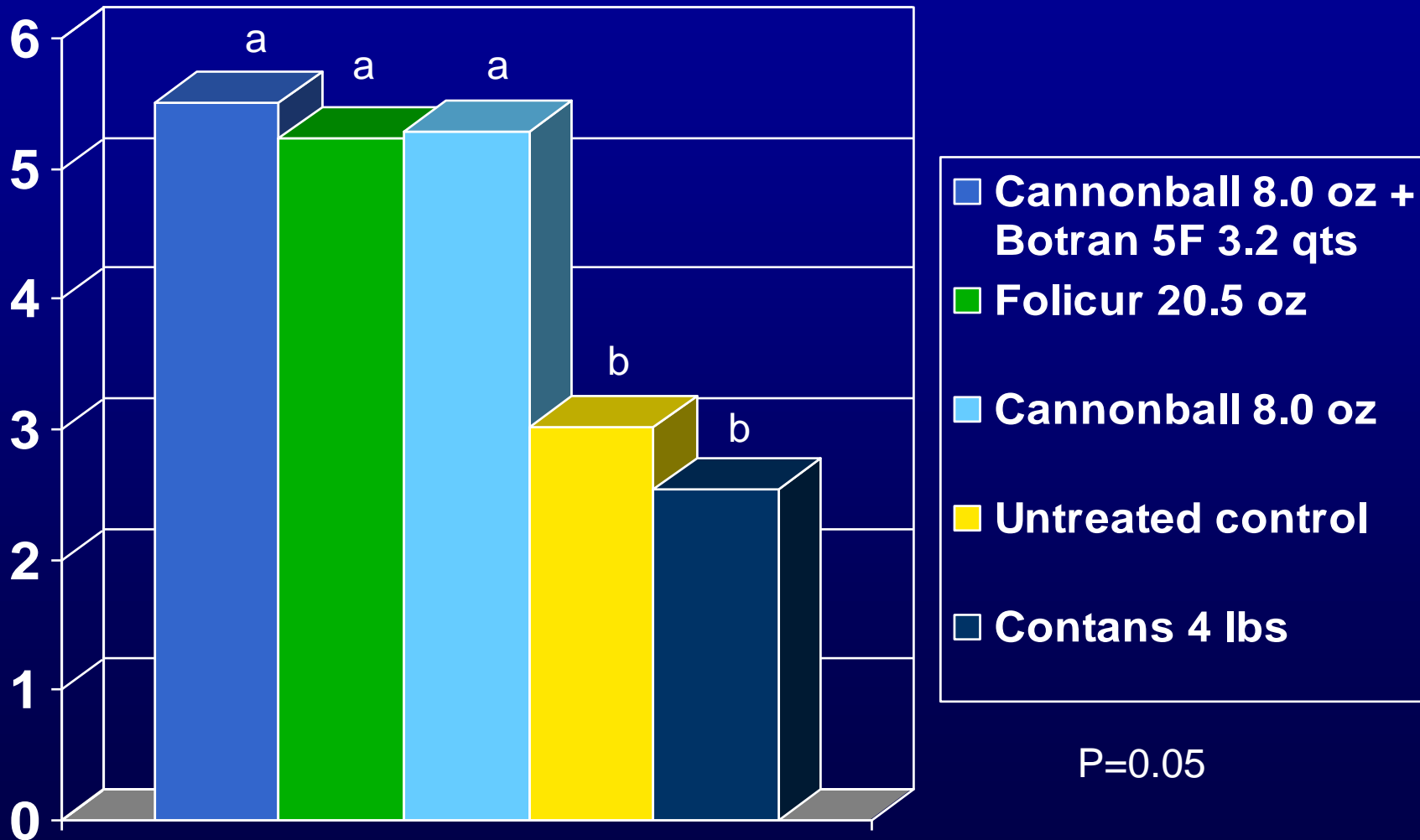
Programs Trial: In furrow

Above-ground symptom severity, 14 May



Programs Trial: In furrow

fresh weights (tons/acre)



Programs Trial: drip applied treatments

Date of application and materials applied			Severity (0-10)		Weights (tons/acre)	
15 Feb	7 Mar	27 Mar	23 Apr	14 May	Fresh wt	Dry wt
Cannonball 8.0oz	Folicur 20.5 oz	xxxxxx	2.52	3.00	4.63	3.82
Cannonball 8.0oz	Folicur 20.5 oz	Endura 6.8 oz	2.40	3.28	4.26	3.82
Folicur 20.5 oz	Cannonball 8.0oz	Endura 6.8 oz	2.24	3.00	4.43	3.91
Untreated control			2.40	3.28	4.07	3.83
LSD _{0.05}			NS	NS	NS	NS

Insecticide Injections for Thrips Control



Thrips Control Programs on Tomato 2007-2009

- Varieties and plant dates
 - H 9997 direct seeded on 9 Mar 07
 - H 9665 direct seeded on 9 Apr 2008
 - H 8004 transplant on 14 May 2009
- Materials were applied in the equivalent of 25 gallons of water with Induce 0.25%
- Experimental design: four-replication randomized complete block

Insecticide Programs

8004 transplanted on 14 May 2009

Main Plot Treatments (drip injected into three 66 in bed, 315 ft long)

- Platinum 11 fl oz (3 Jun)
- Platinum 11 fl oz (3 Jun) and Venom 3.0 fl oz (7 Jul)
- Untreated

Sub-plot treatments (applied in 20 gal water/acre @ 30psi)

# apps.	17 Jun	1 Jul	16 Jul	21 Jul
4	Radiant 6 fl oz	Dimethoate 4EL 1pt	Lannate WP 1lb	Radiant 6 fl oz
3 early	Radiant 6 fl oz	Dimethoate 4EL 1pt	Lannate WP 1lb	
3 late		Dimethoate 4EL 1pt	Lannate WP 1lb	Radiant 6 fl oz
Untreated				

Experimental details

- Four replications , 4 Main plot treatments, 5 sub plot treatments;
- 3 beds per main plot treatments
- 75 ft sub plots

Twenty-Five flowers/plot
collected and thrips counted

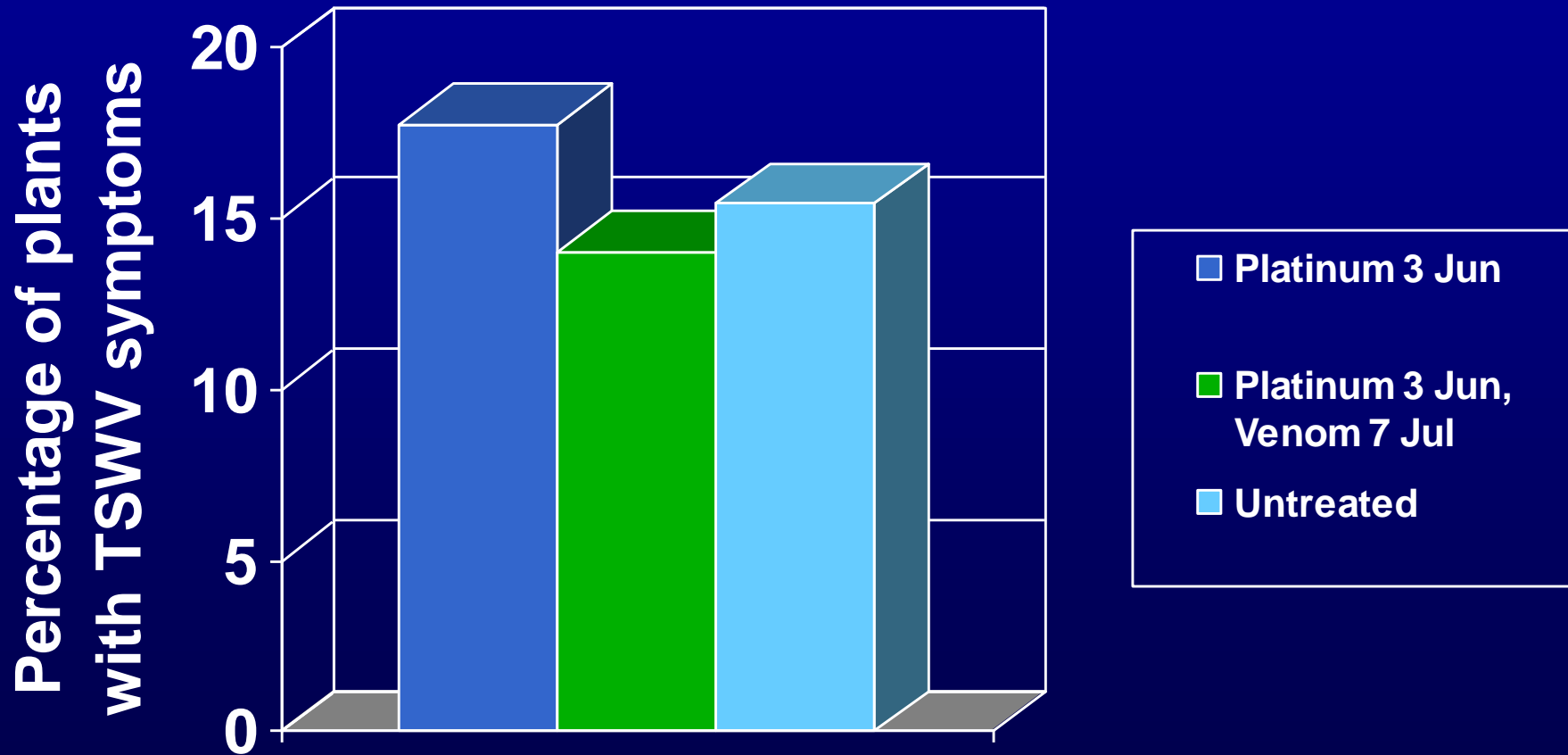


Affect of Subsurface drip applications on thrips densities

16 Jun (13 days after treatment)

Treatment	Thrips/25 flowers
Platinum 11 fl oz on 3 Jun	82.37
Untreated	110.25
P (group comparison)	0.052

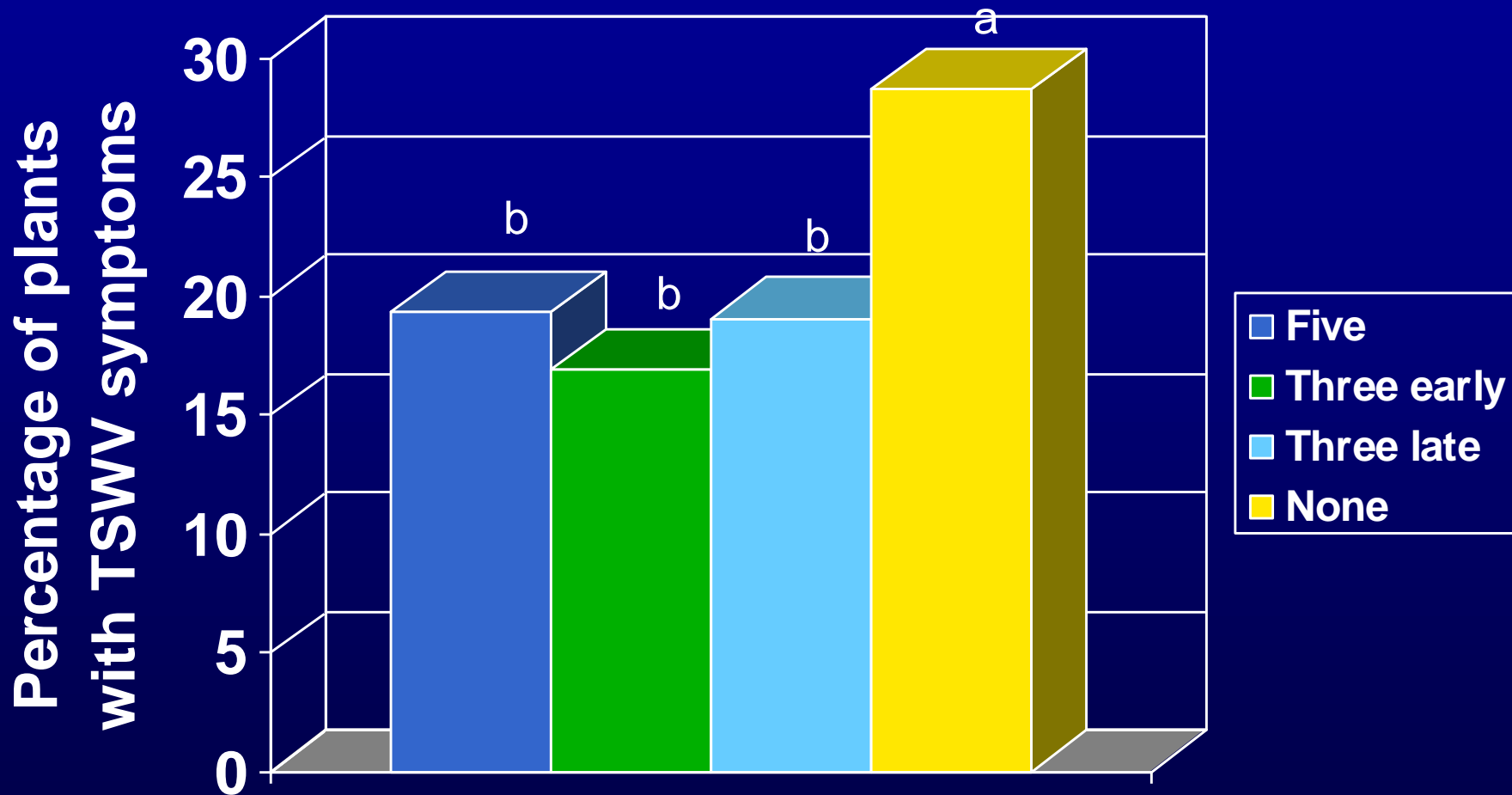
TSW-Symptom Incidence Soil-Applied Insecticide



NO SIGNIFICANT DIFFERENCE $P=0.05$

TSW-Symptom Incidence

Foliar-Applied Insecticide Programs



Summary

- Ridomil and Potassium Phosphate materials have activity against Pythium or Phytophthora applied with SDI.
- Neonicatinoids are documented to be effective through SDI.
- Monosporascus root rot symptoms were reduced with application of Cannonball through SDI system.
- White Rot Control:
 - Endura, Folicur, and Cannonball applied at planting resulted in increased yields.
 - Drip applications with similar treatments did not reduce disease severity or increase yield .
- Under the conditions of thrips studies in tomatoes at WSREC, drip injected materials were not highly effective, but neither were materials with similar mode of action applied by ground rig did not perform well either.

Acknowledgements

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