University of California
Agriculture and Natural Resources

Making a Difference for California

Tomato Powdery Mildew Control

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Leveillula taurica (Oidiopsis sicula)

- 2 in Yolo/Solano commercial fields
- 4 at UCD
- 4 in San Joaquin Co. commercial fields
- 4 in Dos Palos-area commercial fields
- 4 at West Side REC near Five Points

- Powdery mildew developed at 10 out of 18 trials

Mildew control program timings and materials

- Quadris Top alternated with sulfur dust - 7 day interval (July & August)
- Quadris Top alt. sulfur– as above but 14 day interval
- Quadris Top alt. sulfur– 7 day - late start at ~6 weeks before harvest (Aug)
- Quadris Top alt. sulfur – 7 day – early start but ending about 6 weeks before harvest (July)
- Sulfur dust – 7 day (July- August)
- Sulfur dust – 14 day (July- August)
- Wettable sulfur – 14 day (July- August)
- Non-treated control – no mildew fungicides

Tom Turini, WSREC/Fresno

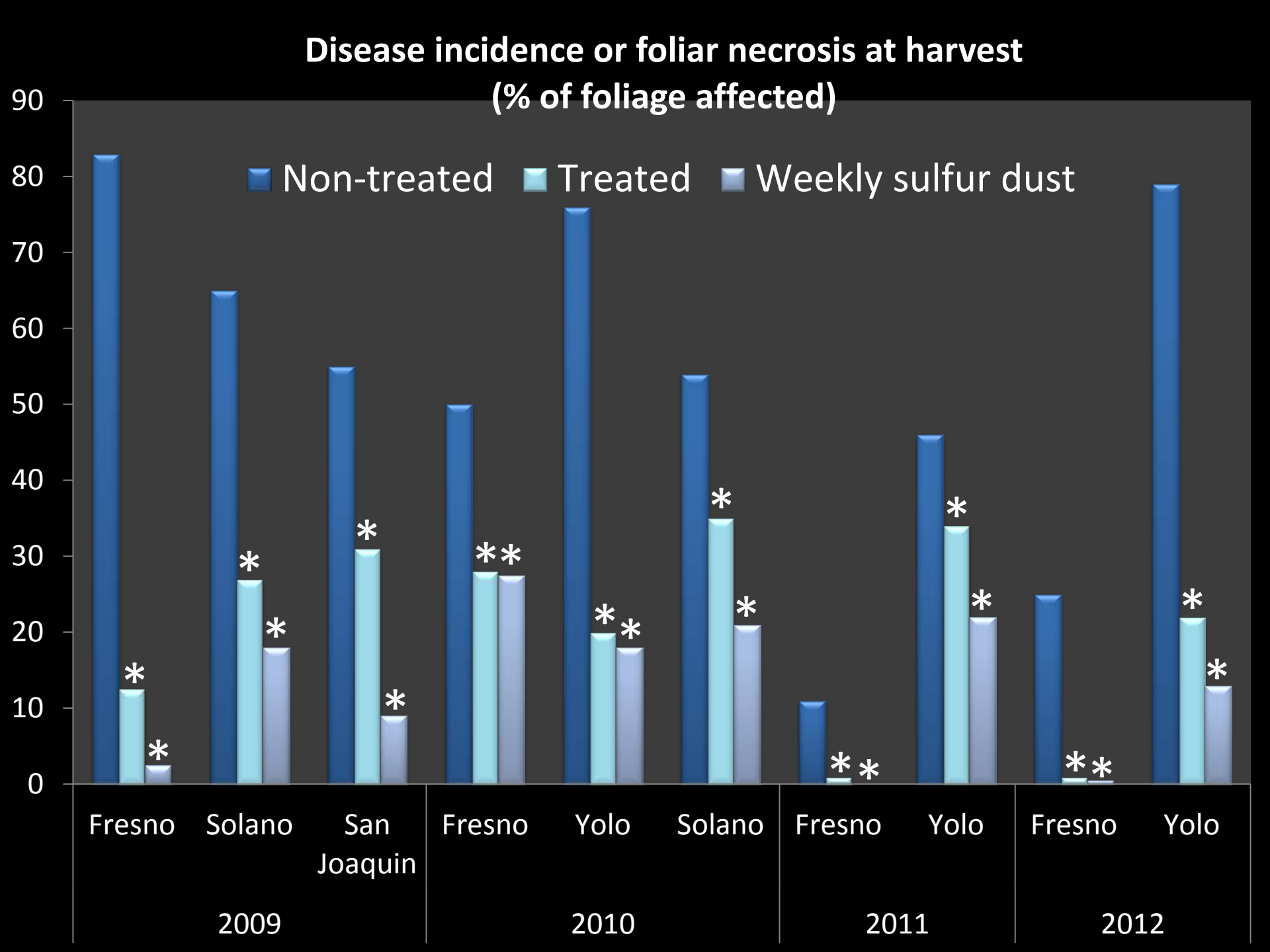
Treatment	Interval (days)	Sprays (#)	Powdery mildew severity rating: 20-Aug	Powdery mildew severity rating: 10-Sep	Yield (tons/ acre)	Sunburn (% fruit by weight)	PTAB lab analysis: Color	PTAB lab analysis: Soluble solids (°Brix)	PTAB lab analysis: pH
Sulfur dust alt. w/ Quadris Top, early stop	7	6	0 b	0 c	30.9 a b	1.45	19.8	6.78 a b	4.53
Sulfur dust	7	11	0 b	0.05 c	29.5 a b	2.77	20.5	7.00 a	4.61
Sulfur dust alt. w/ Quadris Top	7	11	0.05 b	0.1 b c	34.0 a	1.49	20.3	6.88 a b	4.57
Sulfur dust alt. w/ Quadris Top	14	6	0.03 b	0.1 b c	29.2 a b	2.35	19.8	6.68 a b	4.57
Sulfur dust	14	6	0 b	0.1 b c	28.9 a b	2.58	20.8	6.90 a b	4.56
Sulfur dust alt. w/ Quadris Top, delayed start	7	6	0.08 b	0.35 b c	29.5 a b	2.73	20.0	6.68 a b	4.61
Wettable sulfur	14	6	0.15 b	0.68 b	29.4 a b	2.37	20.5	6.45 a b	4.60
Non-treated control	---	0	0.98 a	3.13 a	25.2 b	3	20.8	6.13 b	4.66
<u>Group comparisons</u>									
Non-treated control vs.			0.98	3.13	25.2	3	20.8	6.13	4.66
fungicide programs			0.04	0.2	30.2	2.25	20.2	6.76	4.58

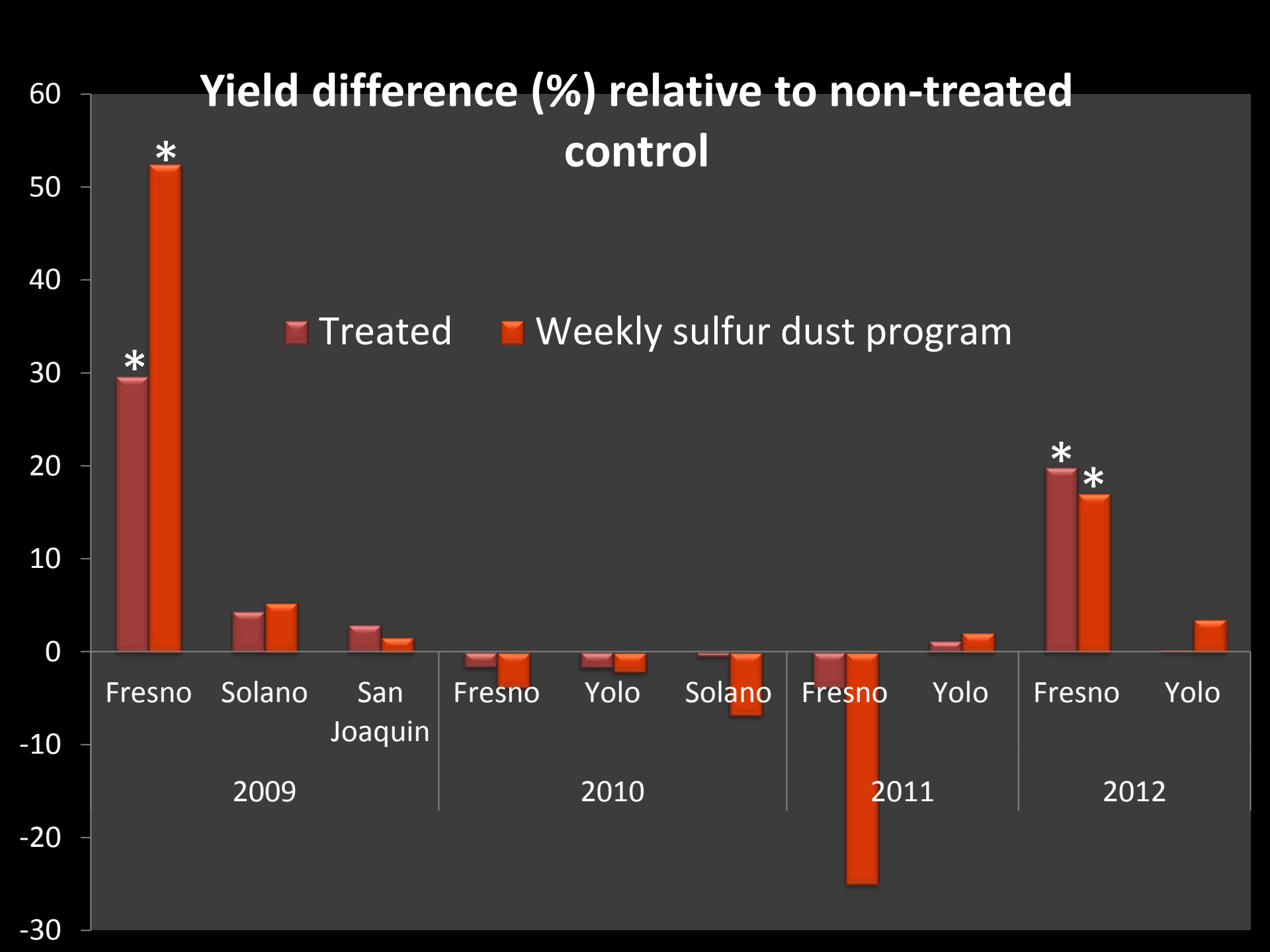
Gene Miyao, Yolo County trial

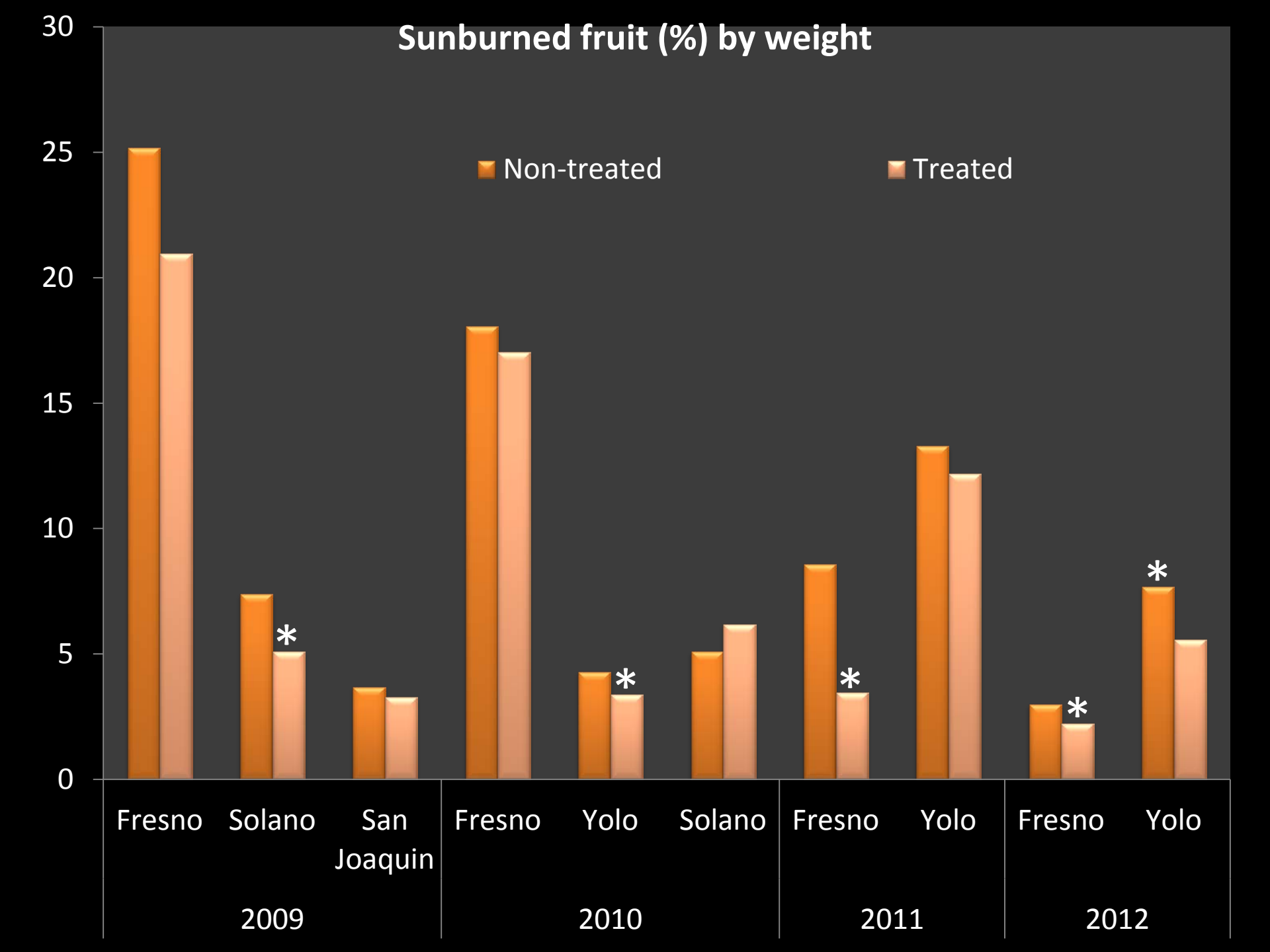
			Powdery mildew disease severity (%)				
	interval	sprays	21-Aug	3-Sep	3-Sep	15-Sep	15-Sep
Treatment	(days)	(#)	incidence	necrosis	incidence	necrosis	incidence
Sulfur dust alt. w/ Quadris Top	7	7	2	18	3	25	13
Sulfur dust	7	7	2	10	3	16	13
Sulfur dust	14	4	3	16	3	25	13
Quadris Top	14	4	1	13	3	25	19
Sulfur dust alt. w/ Quadris Top	14	4	2	18	3	22	22
Sulfur dust alt. w/ Quadris Top, early stop	7	5	2	18	3	28	25
Wettable sulfur	14	4	2	32	5	39	29
Sulfur dust alt. w/ Quadris Top, delayed start	7	4	8	32	22	50	46
Non-treated control	-	0	9	69	76	76	79
		LSD 5%	*3.7*	*12.2*	*7.8*	*13.3*	*16.4*
<u>Group comparisons</u>							
Non-treated control			9	69	76	76	79
vs. fungicide treated			2	20	6	29	22

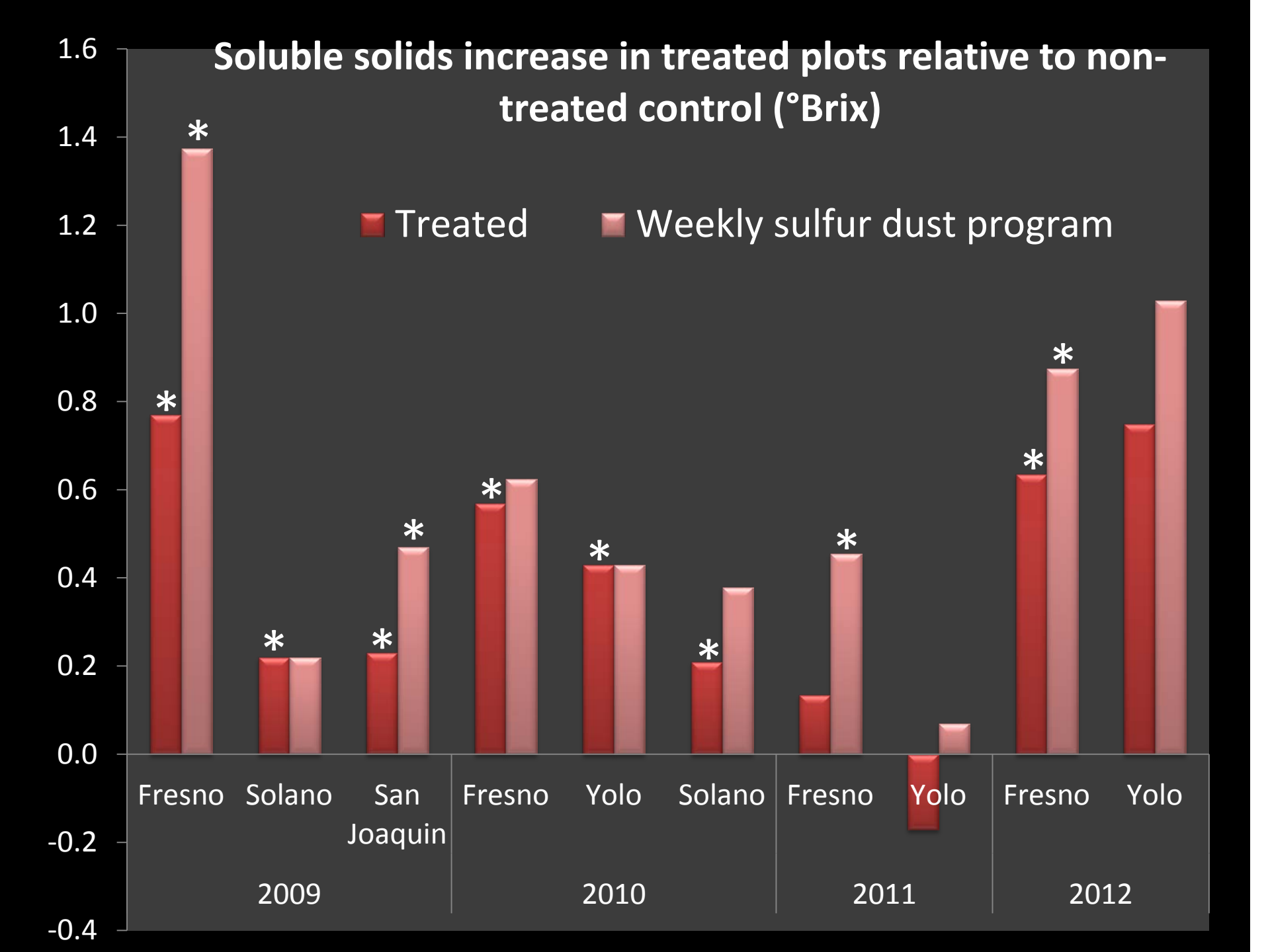
Gene Miyao, Yolo County trial

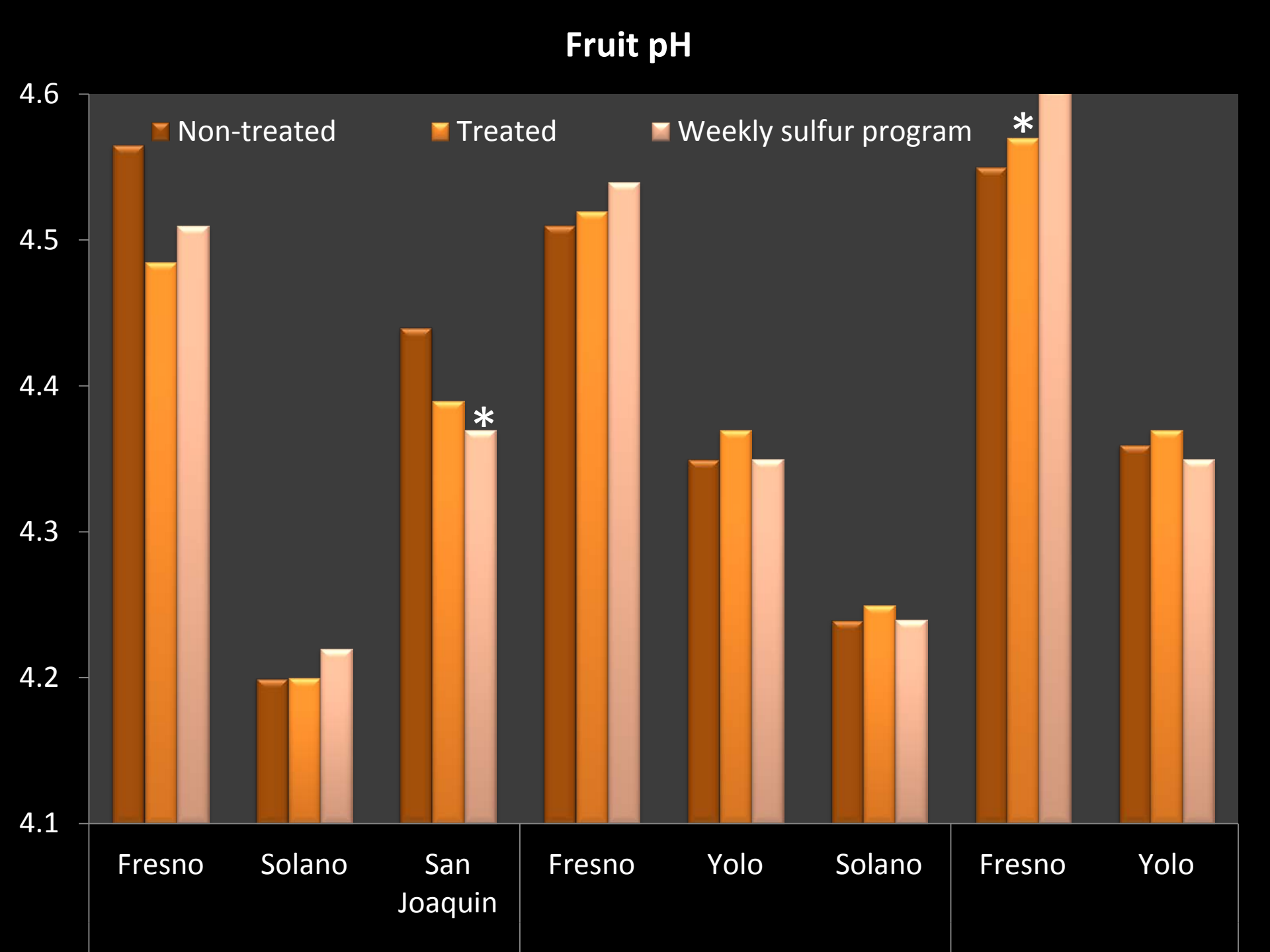
Treatment	interval (days)	sprays (#)	Yield (tons/A)	Sunburn (% fruit by weight)	Soluble solids (°Brix)	Color	pH
Sulfur dust alt. w/ Quadris Top	7	7	38.0	6.4	5.80	22.8	4.43
Sulfur dust alt. w/ Quadris Top	14	4	38.5	4.7	5.68	23.8	4.47
Sulfur dust alt. w/ Quadris Top, delayed start	7	4	25.3	7.1	5.45	23.5	4.49
Sulfur dust alt. w/ Quadris Top, early stop	7	5	39.2	6.1	6.03	22.8	4.47
Sulfur dust	7	7	37.6	5.1	5.98	22.5	4.48
Sulfur dust	14	4	38.2	4.7	5.63	22.0	4.49
Wettable sulfur	14	4	27.4	6.0	5.56	22.0	4.55
Non-treated control	-	0	36.3	7.7	4.95	23.8	4.47
Quadris Top	14	4	46.8	4.8	5.48	22.5	4.44
		LSD 5%	*NS*	*NS*	*NS*	*NS*	*NS*
<u>Group comparisons</u>							
Non-treated control			36.3	7.7	4.95	23.8	4.47
vs. fungicide treated			36.4	5.6	5.70	22.7	4.48

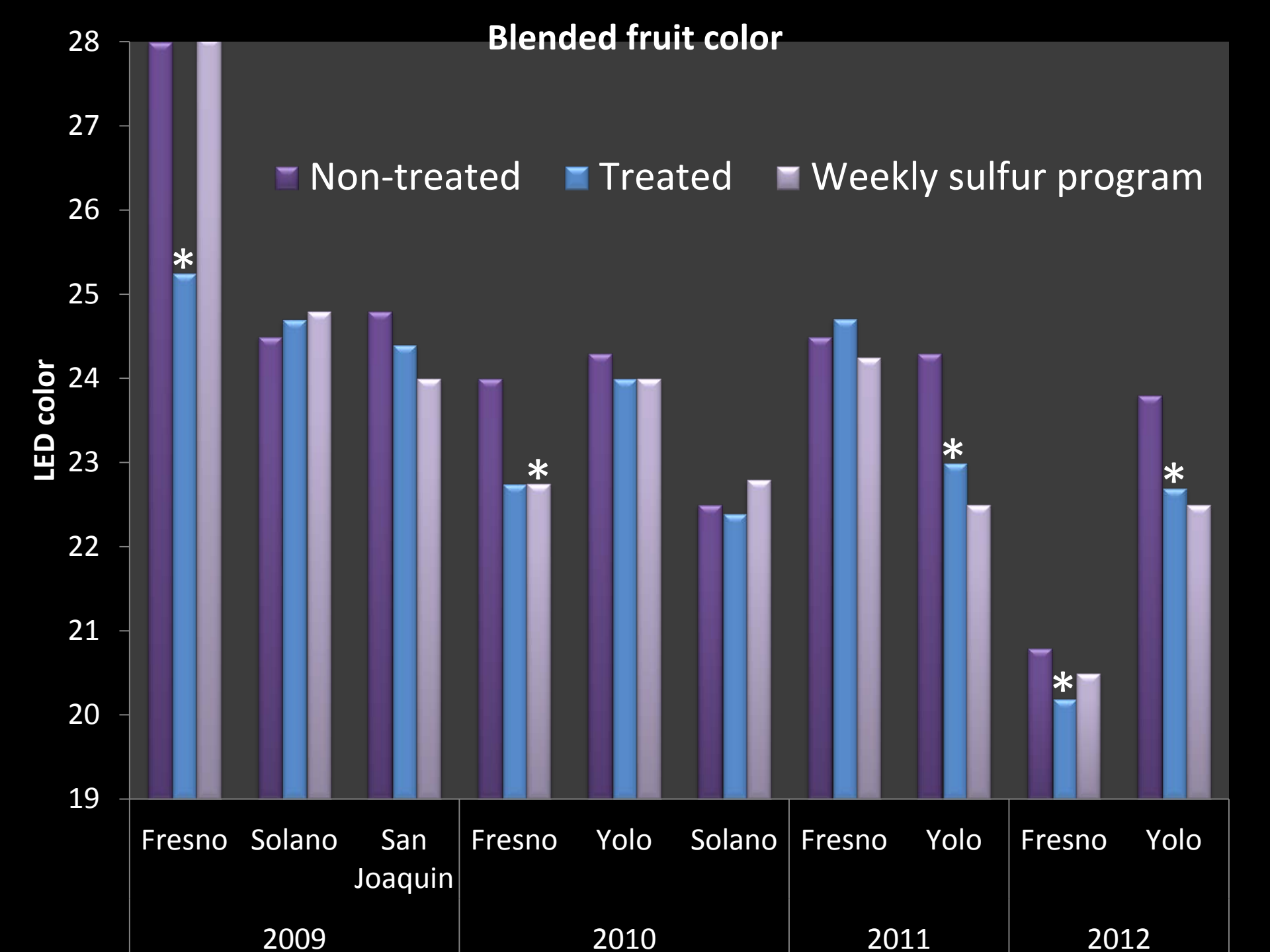

Disease incidence or foliar necrosis at harvest
(% of foliage affected)
Non-treated
Treated
Weekly sulfur dust
90
80
70
60
50
40
30
20
10
0
Fresno
Solano
San Joaquin
Fresno
Yolo
Solano
Fresno
Yolo
Fresno
Yolo
2009
2010
2011
2012


Yield difference (%) relative to non-treated control
Treated
Weekly sulfur dust program
60
50
40
30
20
10
0
-10
-20
-30
*
*
*
*
Fresno
Solano
San Joaquin
Fresno
Yolo
Solano
Fresno
Yolo
Fresno
Yolo
2009
2010
2011
2012


Sunburned fruit (%) by weight
Non-treated
Treated
30
25
20
15
10
5
0
*
Fresno
Solano
San Joaquin
Fresno
Yolo
Solano
Fresno
Yolo
Fresno
Yolo
2009
2010
2011
2012


Soluble solids increase in treated plots relative to non-treated control (°Brix)
Treated
Weekly sulfur dust program
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
Fresno
Solano
San Joaquin
Fresno
Yolo
Solano
Fresno
Yolo
Fresno
Yolo
2009
2010
2011
2012


Fruit pH
4.6
4.5
4.4
4.3
4.2
4.1
Non-treated
Treated
Weekly sulfur program
*
*
Fresno
Solano
San Joaquin
Fresno
Yolo
Solano
Fresno
Yolo


Blended fruit color
Non-treated
Treated
Weekly sulfur program
LED color
28
27
26
25
24
23
22
21
20
19
*
*
*
*
*
Fresno
Solano
San Joaquin
Fresno
Yolo
Solano
Fresno
Yolo
Fresno
Yolo
2009
2010
2011
2012

Conclusions from field trials

Sulfur dust is one of the most effective materials; no phytotoxicity observed in 18 trials with high application rates

Wettable sulfur in some cases was not as effective

Delayed start (August vs July) was sometimes less effective

Under heavy disease pressure, 14-day interval may not be sufficient to protect soluble solids

Powdery mildew increasing one month prior to harvest may affect soluble solids (Brix) without affecting yield; earlier high disease pressure may significantly reduce yields

THANKS!

- Nickels Farming
- Hal Robertson Farms
- Double D Farms
- Arnaudo Bros.
- Del Terra Farms
- Timothy & Viguie
- Button & Turkovich Ranches
- UC West Side Research & Extension Center staff
- UC Davis Plant Sciences field staff

California Tomato Research Institute