

Powdery Mildew Control in Tomatoes

Brenna Aegerter
Michelle Le Strange
Gene Miyao
Scott Stoddard
Tom Turini

University of California
Cooperative Extension



Symptoms

Yellow spots
with or without
visible
sporulation



Symptoms

Sometimes
profuse
sporulation





Necrosis



2011 CTRI-funded trials evaluating spray program timings and materials

- Three trials in commercial fields (Winters, Tracy and Los Banos areas)
- Two trials on-station (West Side Research and Extension Center & UCD campus)
- All trials transplanted in May, harvested in Sept.
- All trials (except Winters-area trial) were with variety SUN6366 or SUN6368
- Powdery mildew developed at two locations

2011 CTRI trials evaluating spray program timings and materials

- Quadris Top alternated with dust sulfur - 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



Field Trial Methods

- Fungicides applied with CO₂ backpack sprayer and a hand-held boom (32 to 40 psi)
- Sulfur dust applied with hand-crank operated duster
- Plots consisted of a single bed by 50 (to 75 feet) – with one buffer row between treated rows – plots replicated four times
- Plots evaluated for:
 - Percent of foliage affected by mildew
 - Percent necrosis at end of season
 - Fruit yield and maturity
 - Fruit quality (sunburn, color, soluble solids, pH)

WSREC trial, Five Points;
Tom Turini, Michelle Le Strange & Devon Rodriquez

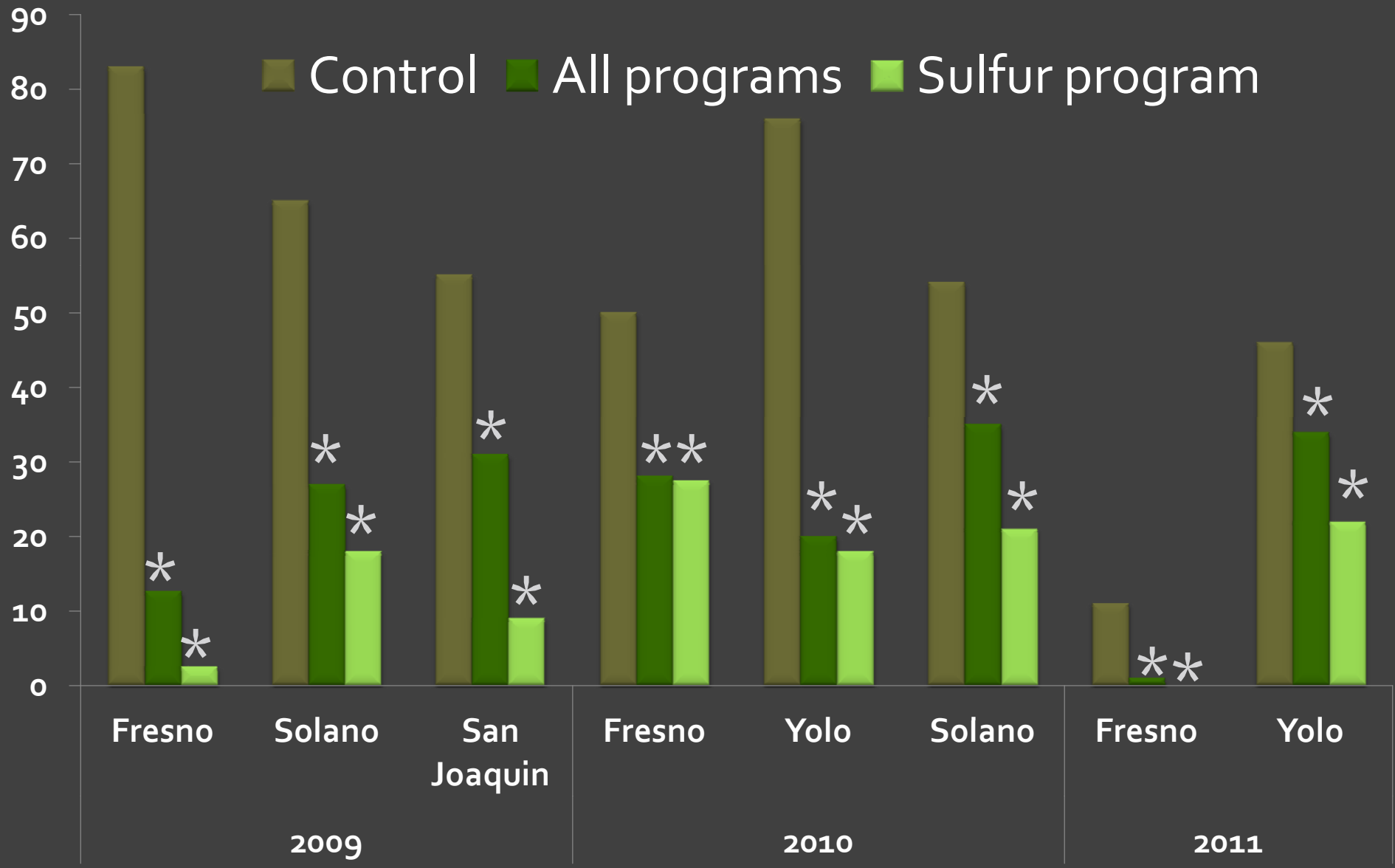
Treatment	Severity rating (0-10) ^Y							
	30-Sep		7-Sep		13-Sep		19-Sep	
Dusting sulfur 50 lbs (6,8,10), Quadris Top 8 fl oz (7,9,11)	0.10	b ^x	0.00	b	0.13	b	0.03	b
Dusting Sulfur 40 lbs (1), Quadris Top 8 fl oz (2,4,6,8,10), dusting sulfur 50 lbs (3,5,7,9,11)	0.33	b	0.05	b	0.08	b	0.05	b
Dusting sulfur 98% 40 lbs (1-11)	0.05	b	0.10	b	0.05	b	0.05	b
Dusting sulfur 98% 40 lbs (1), Luna Sensation 7.2 oz (2,4,6), Quadris Top 8 fl oz (3,5)	0.23	b	0.03	b	0.08	b	0.15	b
Dusting sulfur 40 lbs (1), Quadris Top 8 fl oz (3,7,11), dusting sulfur 50 lbs (5,9)	0.25	b	0.08	b	0.23	b	0.23	b
Dusting sulfur 40 lbs (1), dusting sulfur 50 lbs (3,5,7,9,11)	0.13	b	0.05	b	0.03	b	0.25	b
Dusting sulfur 40 lbs (1), Quadris Top 8 fl oz (2,4), Dusting Sulfur 50 lbs (3,5)	0.03	b	0.10	b	0.38	b	0.48	b
Microthiol 10 lbs (1,3,5,7,9,11)	0.25	b	0.10	b	0.35	b	0.73	b
Untreated	0.65	a	0.60	a	1.38	a	2.08	a

^Y 10 leaves per plot were rated on a pre-transformed scale from 0-10. Means presented as the average rating.

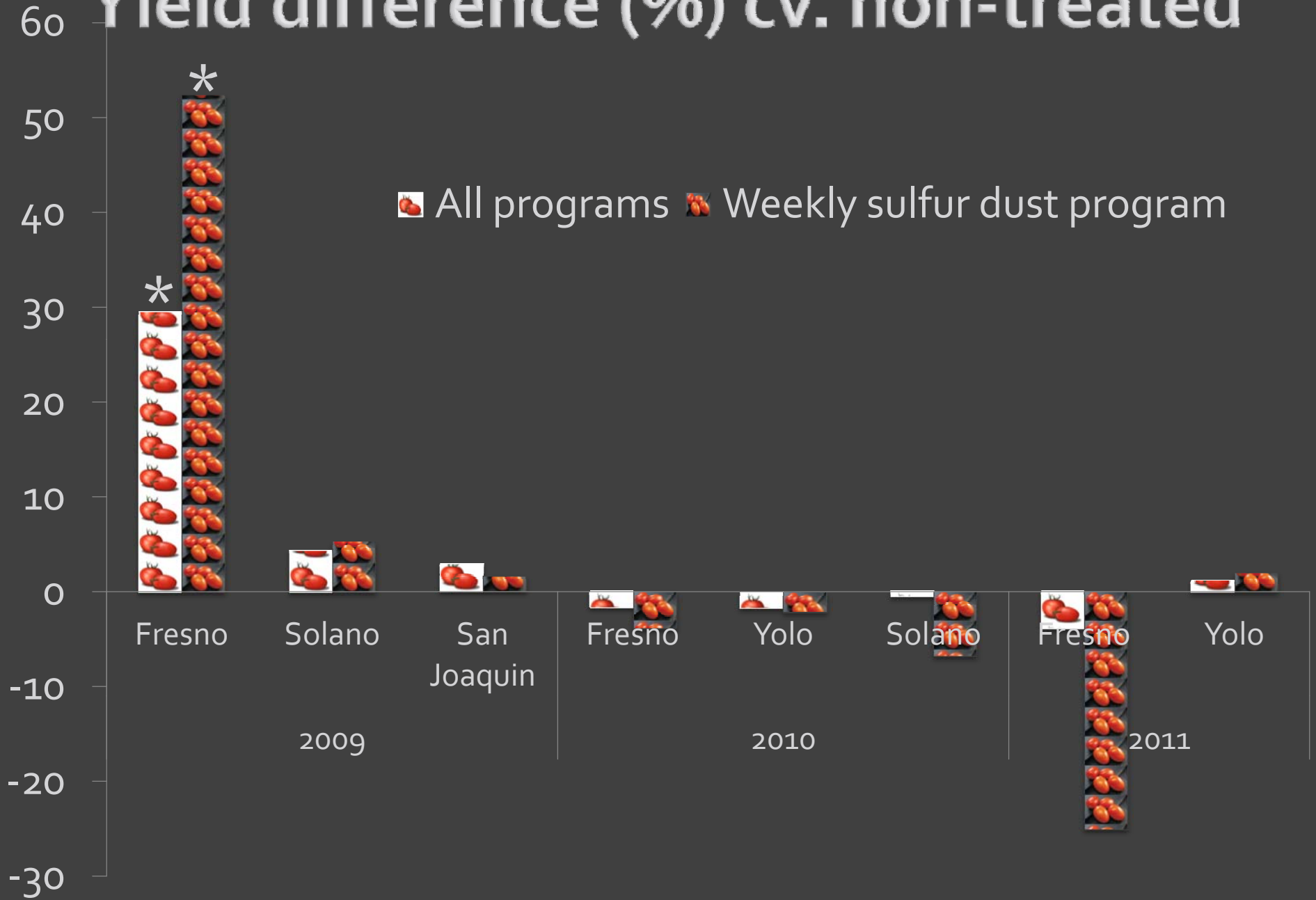
UC Davis trial, Gene Miyao

Treatment	interval (days)	Spray appl. (#)	Yield tons/ac	°Brix	Necrosis (%)			
					31-Aug	15-Sep		
Sulfur dust fb. Vivando	14	5	55.8	6.10	36	a	46	a
Nontreated	0	0	56.0	6.13	35	a	46	a
S dust fb. QuadrisTop	14	5	56.8	6.08	28	abc	43	ab
S dust fb. BAS 703	14	5	57.4	5.93	28	abc	43	ab
S dust alt w/ QuadrisTop (early)	7	5	56.6	5.98	32	ab	39	ab
S dust fb. GWN 4617	14	5	58.5	6.03	25	abc	39	ab
S dust alt. w/ QuadrisTop	7	8	53.5	6.20	25	abc	39	ab
S dust alt w/ QuadrisTop (late)	7	4	54.6	5.83	32	ab	36	abc
Sulfur dust alt. w/ BAS 703	14	5	55.9	6.30	22	bc	32	abc
Sulfur dust alt. w/ QuadrisTop	14	4	59.0	5.83	18	c	29	bc
Sulfur spray	14	4	60.2	5.48	22	bc	28	bc
Sulfur dust fb. GWN 4617	7	8	58.4	5.95	27	abc	28	bc
Sulfur spray	7	8	55.7	5.90	22	bc	28	bc
Sulfur dust	7	8	57.2	6.20	18	c	22	c
Sulfur dust	14	4	56.3	6.00	16	c	22	c
LSD 5%			NS	NS	12.7		16.2	
CV			8	6	35		33	

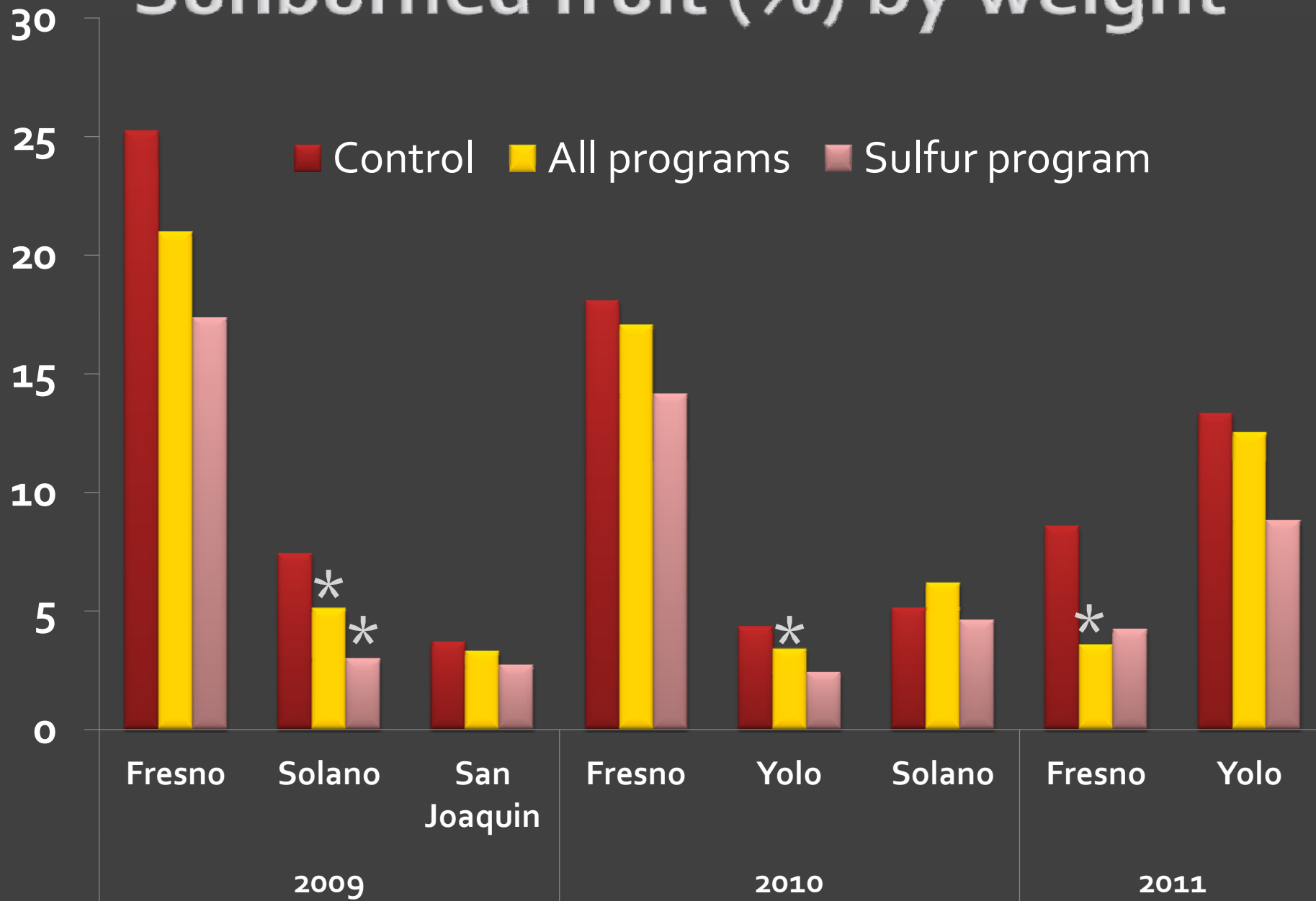
Foliar necrosis (%) at harvest



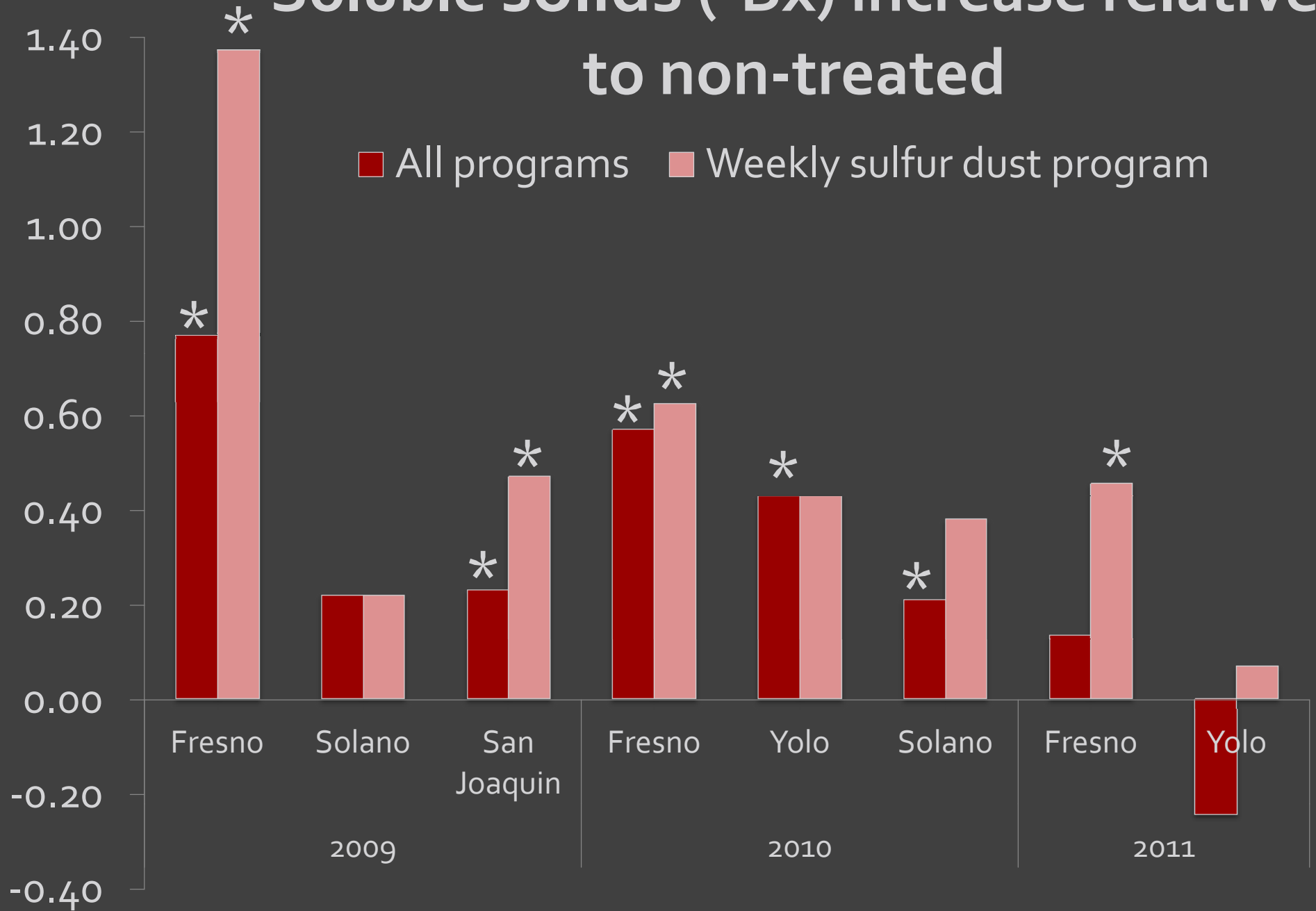
Yield difference (%) cv. non-treated



Sunburned fruit (%) by weight



Soluble solids (°Bx) increase relative to non-treated



Product and rate	YIELD ton/acre	SUNBURN (%)	DISEASE SEVERITY (% foliage affected)		
			16-Sep	30-Sep	6-Oct
non-treated control #1	36.73	5.9%	10.0a	61.3 a	46.3 a
non-treated control #2	33.27	6.7%	10.0a	61.3 a	46.3 a
Sonata 4 qt	31.53	6.4%	8.1ab	42.8 b	35.3abc
Regalia 0.5% alt. w/ Quadris Top 8 oz	33.53	5.8%	8.1ab	42.5 b	39.0ab
Fontelis 24 oz	34.22	8.5%	4.4 bc	38.8 bc	31.5abc
Fontelis 16 oz	34.79	2.4%	8.1ab	35.3 bcd	35.5abc
Acanto 12 oz no adjuvant	34.56	6.4%	8.1ab	31.8 bcd	35.5abc
Microthiol Disperss 20 lb	29.30	7.3%	6.3abc	30.9 bcd	32.8abc
Torino 3.4 oz post-infection only	34.33	7.0%	10.0a	28.0 cde	29.0 bcd
Rally 4 oz	30.33	8.1%	4.4 bc	28.0 cde	25.5 bcde
Acanto 6 oz	33.94	5.6%	8.1ab	28.0 cde	21.8 cdef
Inspire Super 7 oz**	32.13	4.7%	6.3abc	25.5 cde	20.0 cdefg
Mettle 6 oz	32.62	11.6%	4.4 bc	24.5 def	22.8 bcdef
Q8Y78 18 oz	33.45	5.2%	4.4 bc	21.8 defg	24.5 bcdef
Acanto 12 oz	35.36	5.7%	8.1ab	21.8 defg	21.8 cdef
Mettle 4 oz	33.59	8.1%	6.3abc	21.8 defg	19.0 cdefgh
Mettle 8 oz	36.19	6.6%	2.5 c	15.5 efgh	10.9 efghi
Priaxor 8 oz alt. w/ Vivando 15 oz	28.44	7.2%	4.4 bc	10.9 fgh	13.6 defghi
Quadris Top 8 oz (standard)	31.82	6.5%	4.4 bc	10.9 fgh	8.1 fghi
Torino 3.4 oz	31.47	3.1%	4.4 bc	9.0 gh	10.9 efghi
Priaxor 8 oz	29.93	7.9%	2.5 c	6.3 h	4.4 ghi
Quintec 4 oz	34.76	8.4%	2.5 c	6.3 h	2.5 hi
Quintec 12 oz	31.50	7.9%	2.5 c	6.3 h	1.9 i
Quintec 8 oz	30.91	5.6%	4.4 bc	2.5 h	1.3 i
Mean	32.86	6.6%	5.9	25.5	22.5
CV	15.9%	64.3%	54.6%	39.2%	52.2%
P value	NS	NS	0.0028	< 0.0001	< 0.0001

WSREC trial, Five Points; Tom Turini & Devon Rodriguez

Treatments	Disease severity rating (0-10) ^Y			
	30-Aug	7-Sep	14-Sep	
Quadris Top 8 fl oz	0.23	0.25 ab	0.18	e
Quintec at 4 floz	0.10	0.15 b	0.23	de
Priaxor 8 oz	0.10	0.25 ab	0.23	de
Torino SC 3.4 fl oz	0.13	0.23 ab	0.23	cde
Luna Sensation 7.6 fl oz	0.15	0.20 ab	0.25	cde
Priaxor 8 oz alt. w/Vivando 15 fl oz + Silglow 0.05%	0.30	0.33 ab	0.35	bcde
Vivando 15 fl oz + Silglow 0.05 %	0.20	0.40 ab	0.53	bcde
Bravo Top 1.5 pt	0.33	0.53 ab	0.60	abcde
Mettle 8 oz	0.28	0.73 ab	0.90	abcd
Fontelis LEM SC 24 fl oz <i>without surfactant</i>	0.58	0.80 ab	0.93	abc
Bravo Top 2 pt	0.65	0.93 ab	1.00	abc
Bravo Top 1.5 pt <i>without surfactant</i>	0.53	0.58 ab	1.05	abc
Fontelis LEM SC 24 fl oz	0.85	1.08 ab	1.18	ab
Sonata ASO at 4 quarts	0.75	0.88 ab	1.38	a
Untreated Control	0.68	1.05 a	1.38	a

^Y 10 leaves per plot were rated on a pre-transformed scale from 0-10. Means presented as the average rating.

Chemical control

Many registered materials are effective, but sulfur dust is one of the best treatments, as are Quadris Top (strobilurin/11 plus DMI/3), and Quadris (strobilurin/11)

Several promising materials in four new/different chemical classes (not yet registered for tomato)

Conclusions

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

Preventative applications are needed, 2-week treatment interval may be too long when disease pressure is high?

Young plants appear less susceptible

Thank you!

- California Tomato Research Institute
- Our cooperating growers and PCAs
 - Hal Robertson Farms
 - Del Terra Farms
 - Nickels Farming
 - Timothy & Viguie Farms
 - Button & Turkovich Ranches
- Technical and field support staff of
 - UCCE
 - UC Davis Plant Sciences field facility
 - UC WSREC

