

Powdery Mildew Control in Tomatoes

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Symptoms

Yellow spots (or not)

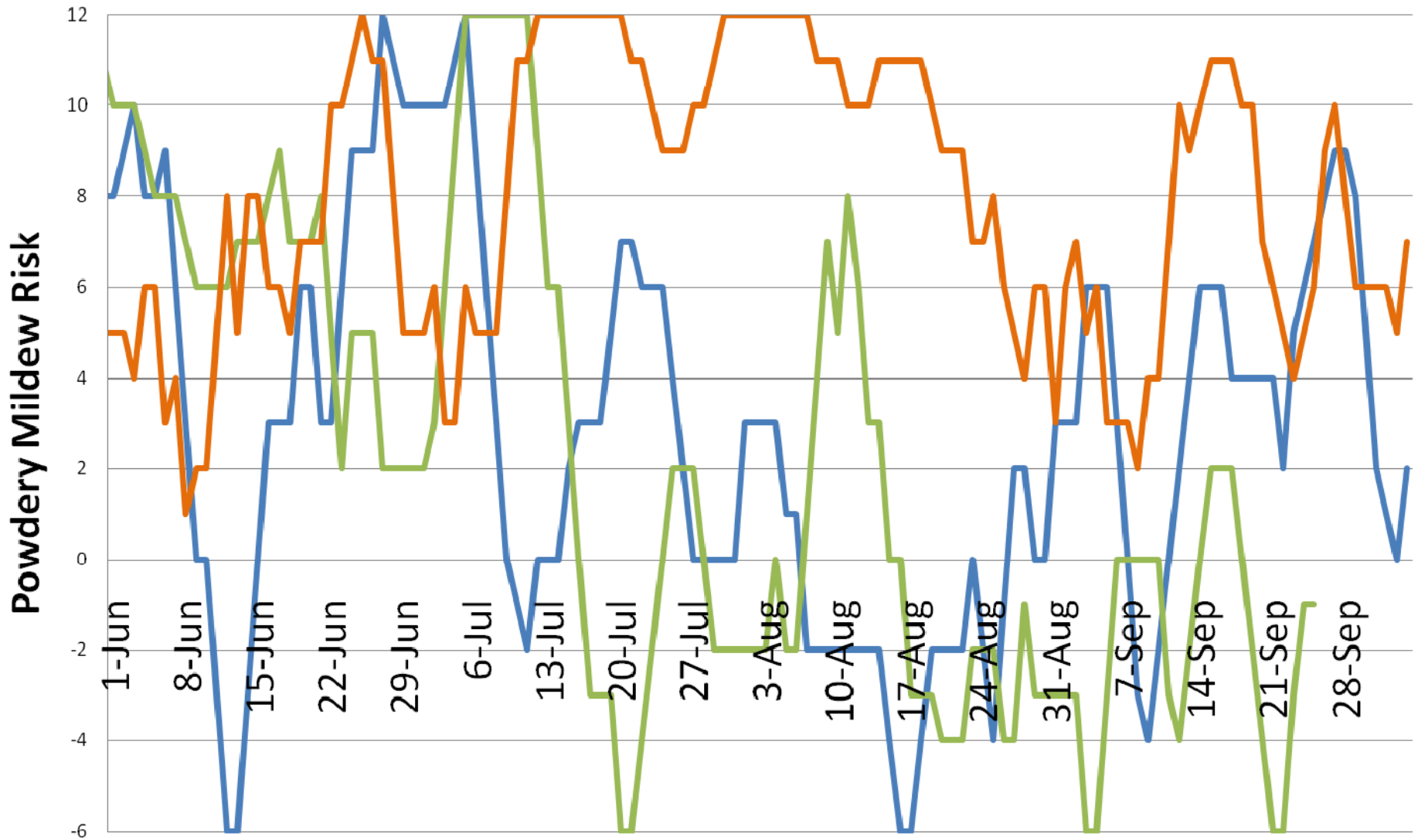
Powdery white sporulation (or not)

Turning necrotic in age



- Powdery Mildew Risk -
from model prediction, data from weather station near Winters

— 2008 — 2009 — 2010



2010 CTRI trials evaluating spray program timings and materials

- ▶ Three trials in commercial fields (Davis-Dixon, Stockton 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 Davis-Dixon area trial) were with variety SUN6366
- ▶ Powdery mildew developed at all but one trial location (Stockton)

2010 CTRI trials evaluating spray program timings and materials

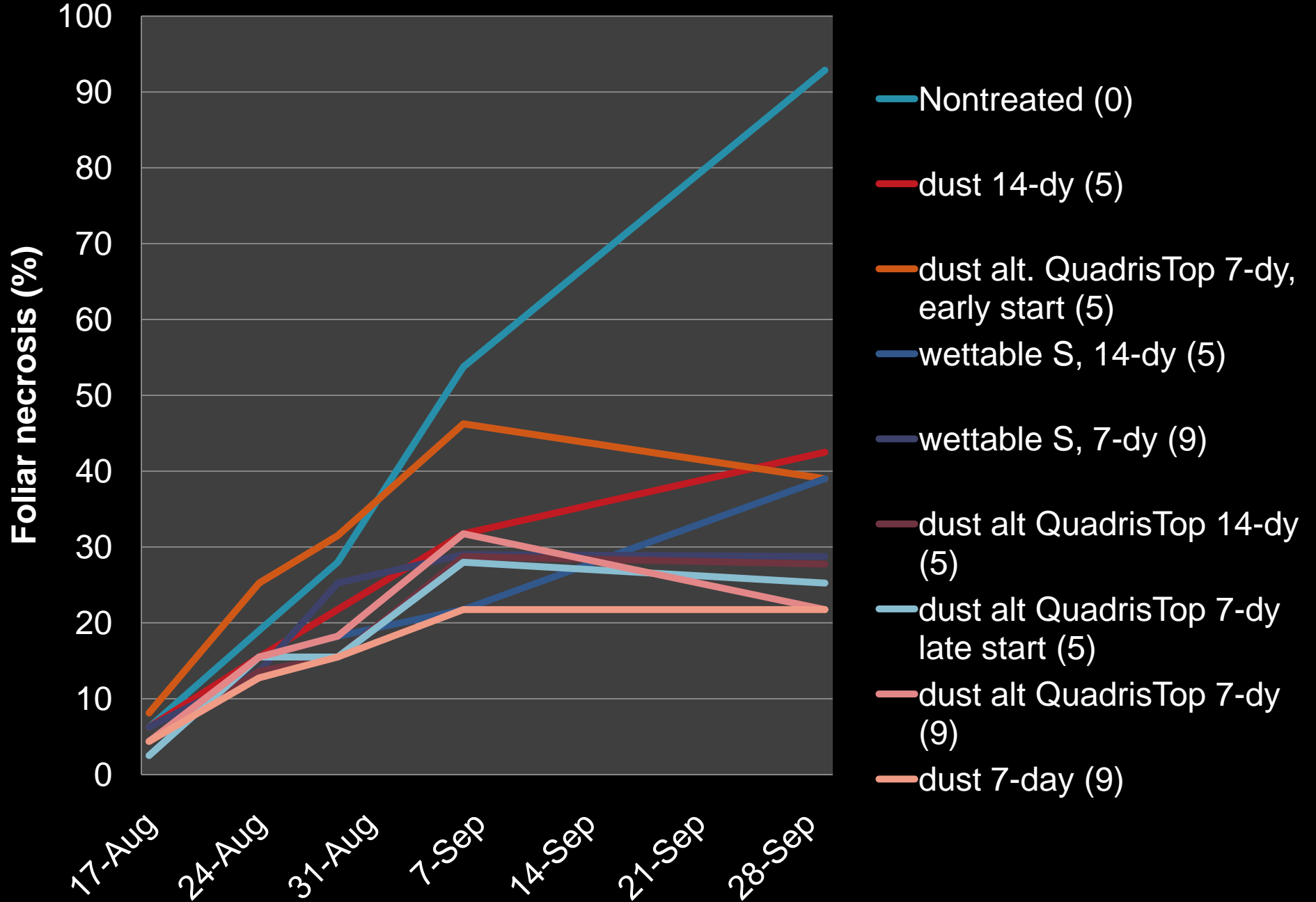
- ▶ Quadris Top alternated with dust sulfur - 7 day interval (July & August)
- ▶ Quadris Top alt. sulfur– as above but 14 day interval
- ▶ Quadris Top alt. sulfur– 7 day - late start at ~6 weeks before harvest (August)
- ▶ Quadris Top alt. sulfur – 7 day – early start but ending about 6 weeks before 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

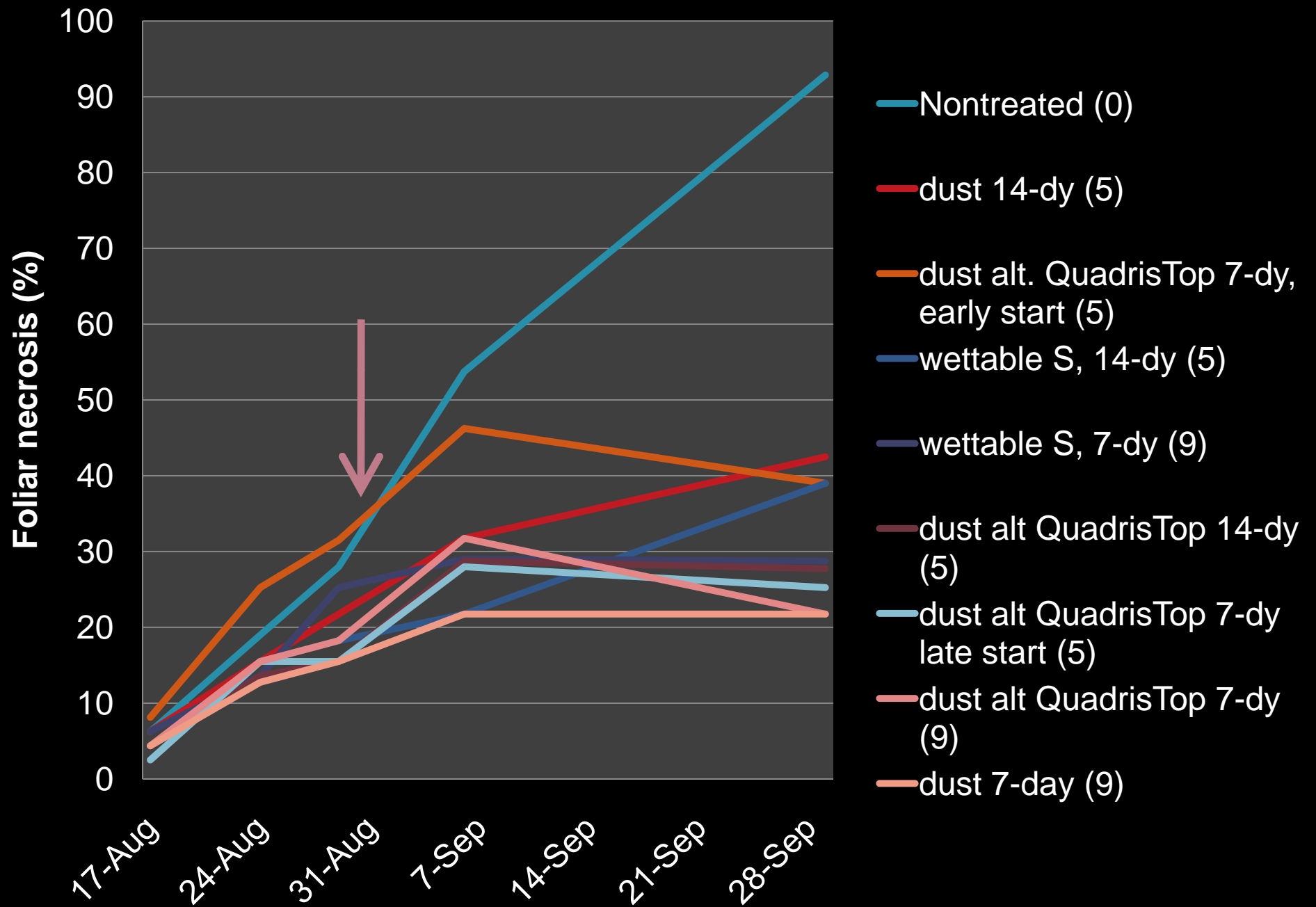
- ▶ Fungicides applied with CO₂ backpack sprayer and a hand-held boom (32 to 40 psi)
- ▶ Sulfur dust applied with hand-crank operated duster
- ▶ Plots consisted of a single bed by 50 (to 75 feet) – with one buffer row between treated rows – plots replicated four times
- ▶ Plots evaluated for:
 - Percent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



Foliar necrosis at UCD trial mid-Aug to late Sept 2010



Foliar necrosis at UCD trial mid-Aug to late Sept 2010



UCD campus trial Treatments	Spray interval (days)	sprays (#)	Yield (ton/a)	Sunburn (%)	Soluble solids (°Bx)	Color	pH
Nontreated	-	-	57.79	4.3	5.0	24.3	4.33
Sulfur dust	14	5	55.27	3.4	5.4	23.5	4.40
Sulfur dust alt w/ QuadrisTop (early start)	7	5	54.33	5.4	5.7	23.0	4.39
Wettable sulfur	14	5	60.38	2.2	5.1	23.5	4.38
Wettable sulfur	7	9	53.24	3.9	5.7	23.8	4.39
Sulfur dust alt w/ QuadrisTop	14	5	58.42	3.6	5.6	23.3	4.36
Sulfur dust alt w/ QuadrisTop (late start)	7	5	59.65	3.5	5.3	25.0	4.35
Sulfur dust alt. w/ QuadrisTop	7	9	56.66	3.2	5.5	25.5	4.37
Sulfur dust	7	9	56.54	2.4	5.4	24.0	4.35
		LSD	NS	NS	NS	NS	NS
		CV	10.9	45.2	7.1	5.4	1.0
<u>Group comparisons</u>							
Treated vs			57.5	3.1	5.41	23.7	4.37
non-treated			56.9	4.1	5.00	24.1	4.35

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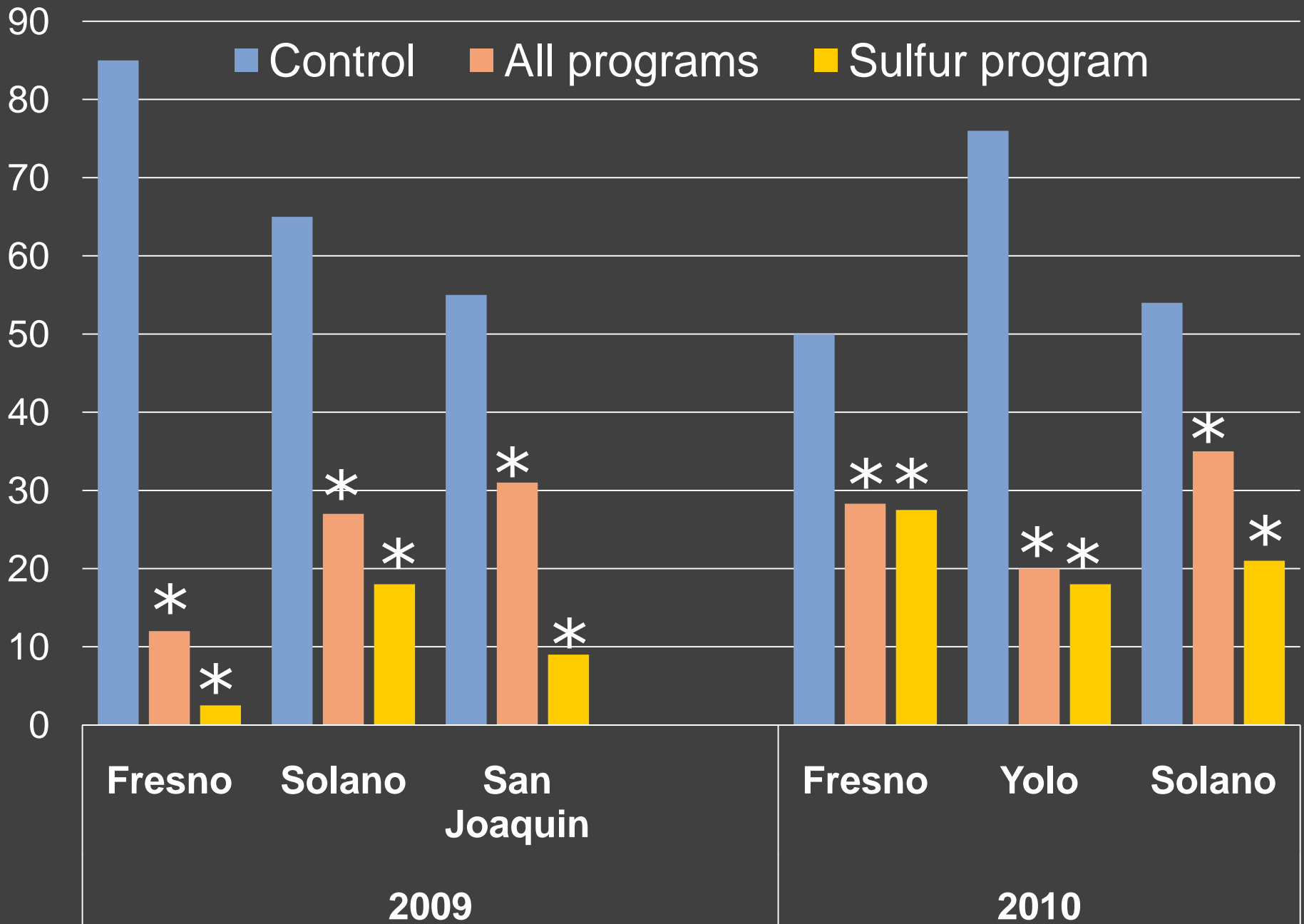
UC WSREC trial Treatments	Spray interval (days)	Sprays (#)	Necrosis (%) Sept 8		Yield (ton/a)	Sunburn (%)	Soluble solids (°Bx)		Color	pH
Nontreated	-	-	50.0	a	24.06	18.1	5.60	b	24 a	4.51
Sulfur/Luna/Quadris Top	14	5	30.0	b	21.97	20.5	6.18	a	23.5 ab	4.49
Sulfur dust alt w/ QuadrisTop	14	5	26.3	b	21.84	20.7	6.18	a	23 abc	4.53
Sulfur dust alt w/ QuadrisTop	7	9	27.5	b	25.24	12.8	6.13	a	22.5 bc	4.51
Sulfur dust	14	5	26.3	b	25.68	17.5	6.18	a	22.75 c	4.49
Sulfur dust alt w/ QuadrisTop (early start)	7	5	31.3	b	23.12	13.7	6.15	a	22.75 c	4.50
Wettable sulfur	14	5	26.3	b	23.68	17.1	6.13	a	22.75 c	4.52
Sulfur dust alt w/ QuadrisTop (late start)	7	4	31.3	b	23.04	23.4	6.23	a	22.75 c	4.51
Sulfur dust	7	9	27.5	b	23.14	14.1	6.23	a	22.75 c	4.54
		LSD	13.73		NS	NS	0.34		1.04	0.05
		CV%	30.66		13.25	39.3	3.82		3.09	0.83

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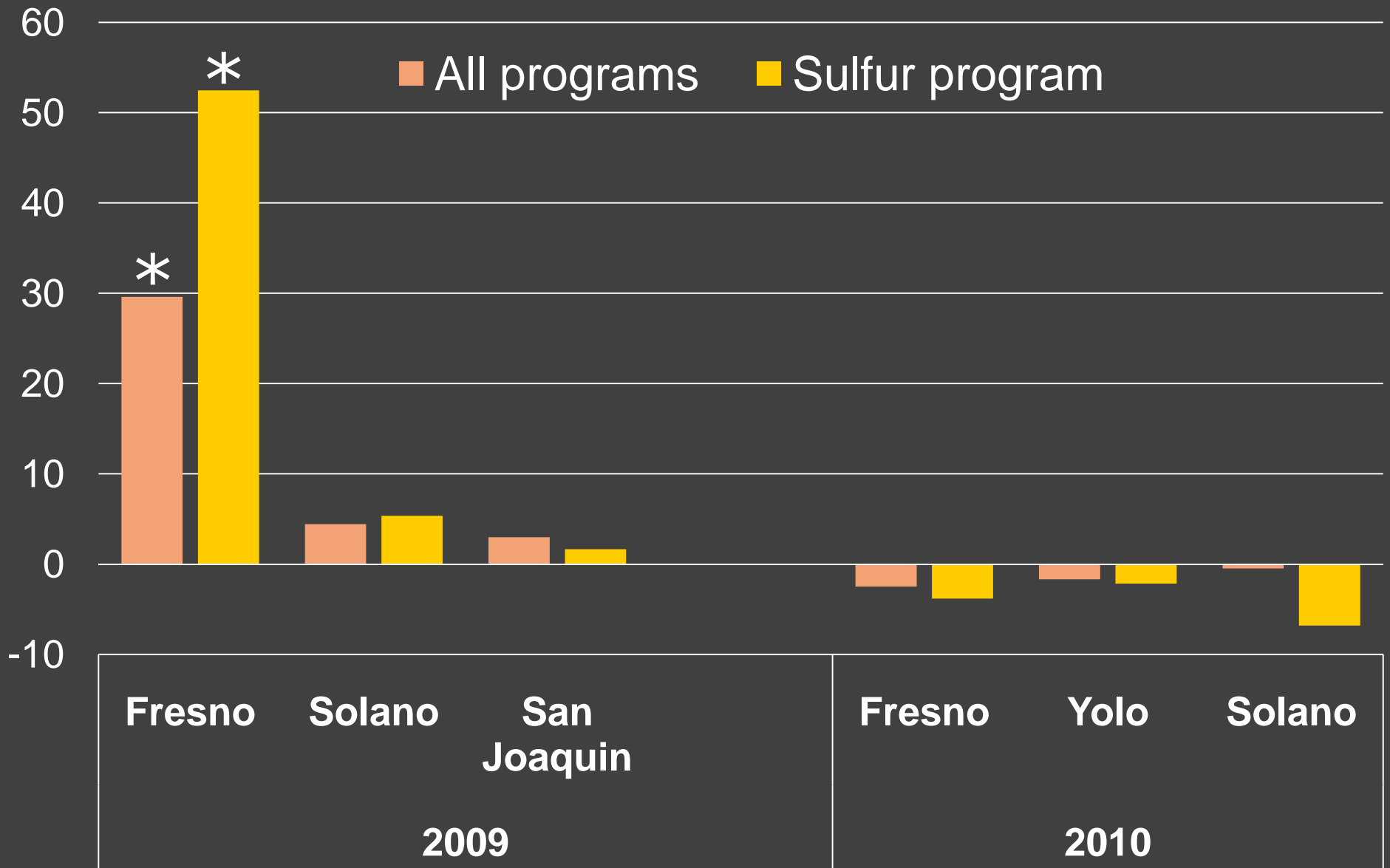
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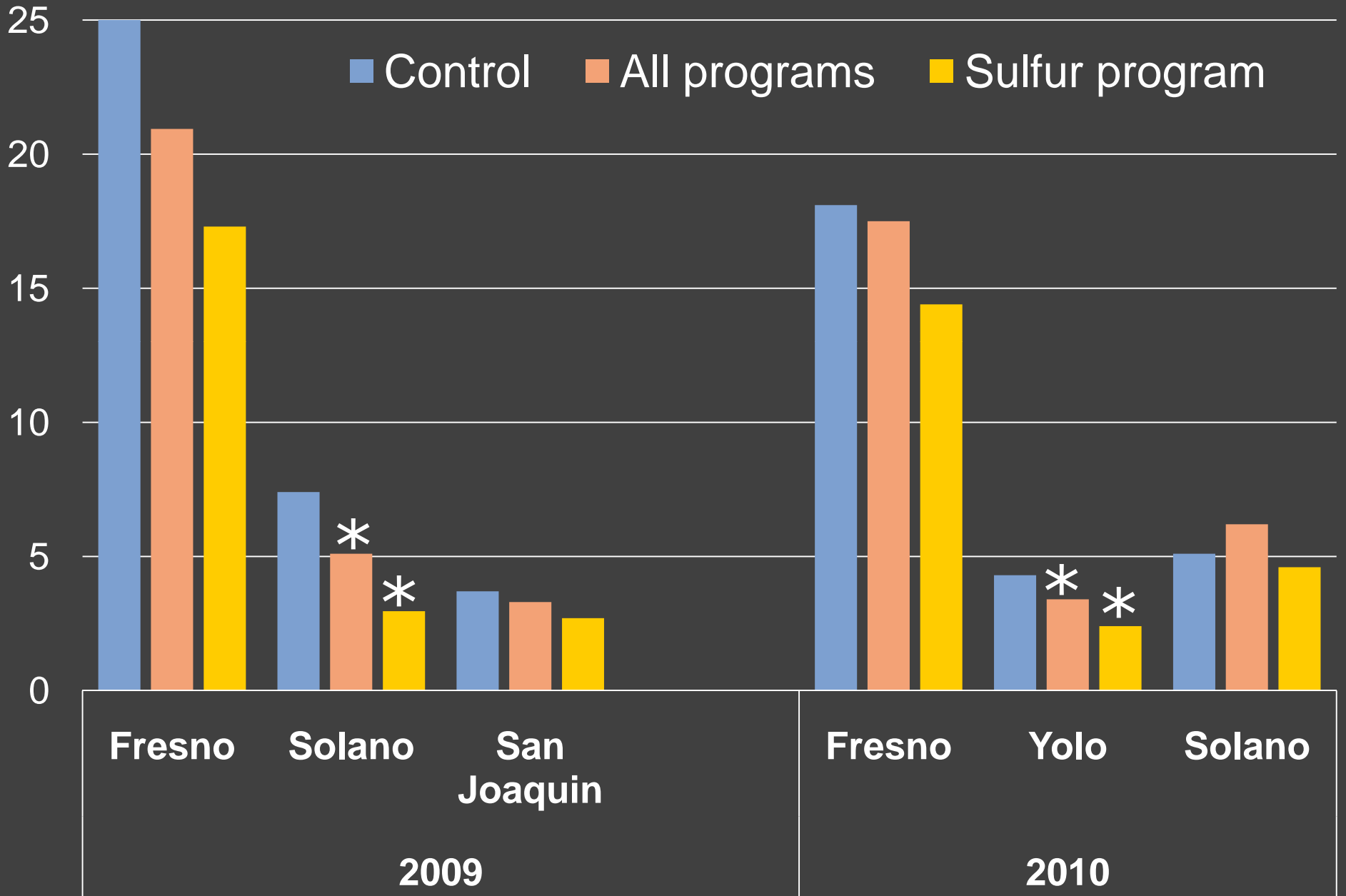
Foliar necrosis at harvest (%)



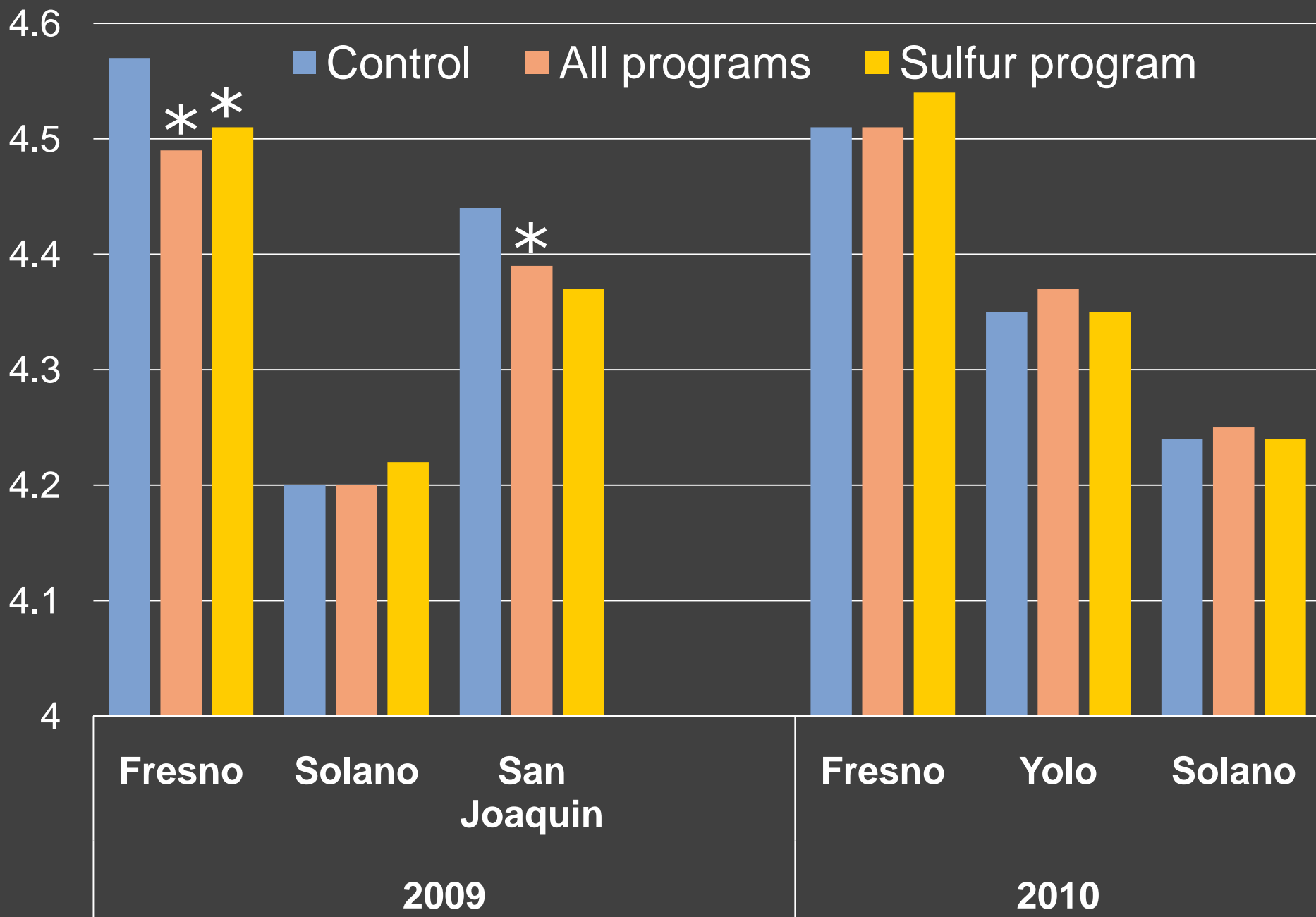
Yield increases (%) relative to non-treated control



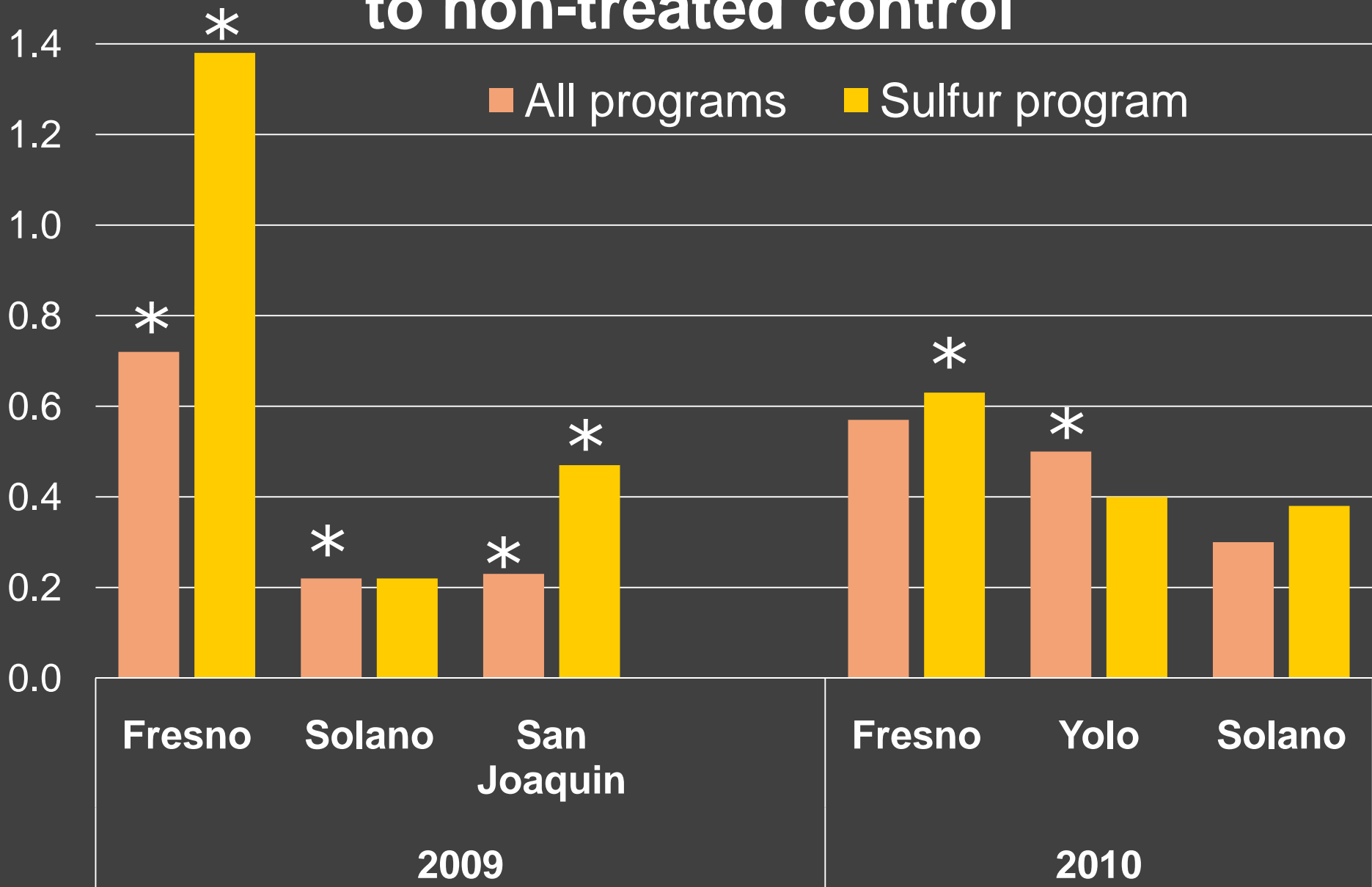
Sunburned fruit (% by weight)



Fruit pH



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



Year	Trial location	Mildew start date relative to harvest	Necrosis level in nontreated	Yield impact significant?	Soluble solids impacted?
2009	Solano	1 mo.	65%	No	5.48 vs 5.08
2009	San Joaquin	1 mo.	60%	No	4.9 vs 4.43
2009	Merced	-----	-----	-----	-----
2009	Fresno	2 mo.	85%	35% yield reduction	5.38 vs 4.0
2010	Solano	1 mo.	54%	No	No
2010	Yolo	1 mo.	93%	No	5.4 vs 5.0
2010	San Joaquin	-----	-----	-----	-----
2010	Merced	-----	Low	No	No
2010	Fresno	1 mo.	50%	No	6.23 vs 5.6

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Conclusions

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- ▶ Preventative applications are needed, and a 2 week treatment interval may be too long when disease pressure is high?
- ▶ Young plants appear less susceptible
- ▶ If mildew is controlled during fruit sizing/early ripening, then perhaps OK to back off near end?

Fungicide screening trials

- ▶ 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)
- ▶ Promising materials in new/different chemical classes (not yet registered for tomato):
 - Luna (fluopyram, SDHI/7, Bayer), Luna Sensation
 - Vivando (metrafenone, benzophenone/U8, BASF)
 - Torino (cyflufenamid, phenyl-acetamide/U6, Gowan)
 - Quintec (quinoxifen, quinoline/13, Dow)
 - Q8Y78 (penthioopyrad, 7 + picoxystrobin, 11, DuPont)

Thank you!

- ▶ California Tomato Research Institute
- ▶ Our cooperating growers and PCAs
 - Double D Farms
 - Del Terra Farms
 - Nickels Farming
 - Timothy & Viguie Farms
- ▶ Technical and field support staff of
 - UCCE
 - UC Davis Veg Crops field facility
 - UC WSREC

