FUSARIUM WILT, RACE 3 VARIETY EVALUATIONS

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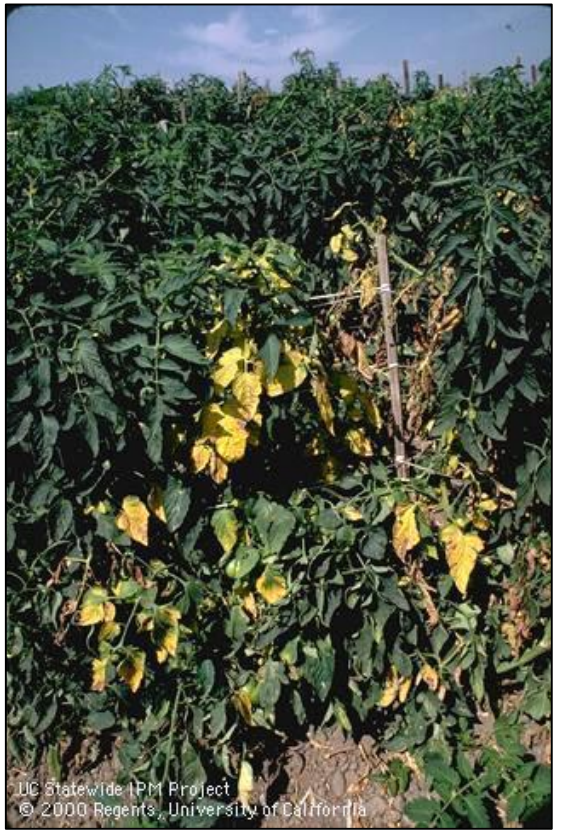
Colusa, Sutter, Yuba counties

Fusarium wilt, *Fusarium oxysporum* f. sp. *lycopersici*

- Soilborne fungal pathogen
- Infects plants through the rootlets
- Individual branches and leaves become yellow and wilt
  - Yellow flag effect
- Dark brown discoloration extends far up the stem
- Reduces yield in fields with a high amount of disease
- Long-lived in soil as spores, or on surfaces of other plants
- Spreads by seed, transplants, and soil on farm machinery
- Favored by warm weather
- Spread can be limited by cleaning farm equipment
- Rotation out of tomatoes for several years reduces inoculum level
- Control method is resistant tomato varieties



UC-IPM Pest Management Guidelines

Objective

- **Compare performance of Fusarium wilt, race 3 resistant varieties in replicated tests from Colusa to Fresno in grower fields with a history of the disease**

Procedures

- 15 varieties
  - 2 tolerant (HM 3887, DRI 319) and 1 susceptible (H 8504)
- Knights Landing (Sutter), Woodland (Yolo), Stockton (San Joaquin), Dos Palos (Merced), and Huron (Fresno)
- Randomized complete block with 4 replicates
- Single lines on 60-inch to double lines on 80-inch centered beds
- Buried drip irrigation
  - Sutter site was sprinkler irrigated season long
- Plant stands were counted in each plot to later calculate % infected plants
  - Visual tallies of symptomatic plants
- Mechanically transplanted and harvested
- Fruit yield measured with portable cart with weigh sensors
- Subsample of fruit from harvester to measure culls by weight
  - Green and pink fruit, sunburn, mold, and blossom end rot
- PTAB determined color, Brix, and pH

Results

- H 8504 incidence of Fusarium averaged 24% (Sutter), 20% (Yolo), and 29% (San Joaquin) in northern sites
  - Low (2%) or no Fusarium detected in southern sites (Merced and Fresno)
- Top yielding varieties in northern sites were HM 3887 and N 6428
  - H 8504 was in the lowest yielding group
- Brix performance was location dependent and variable

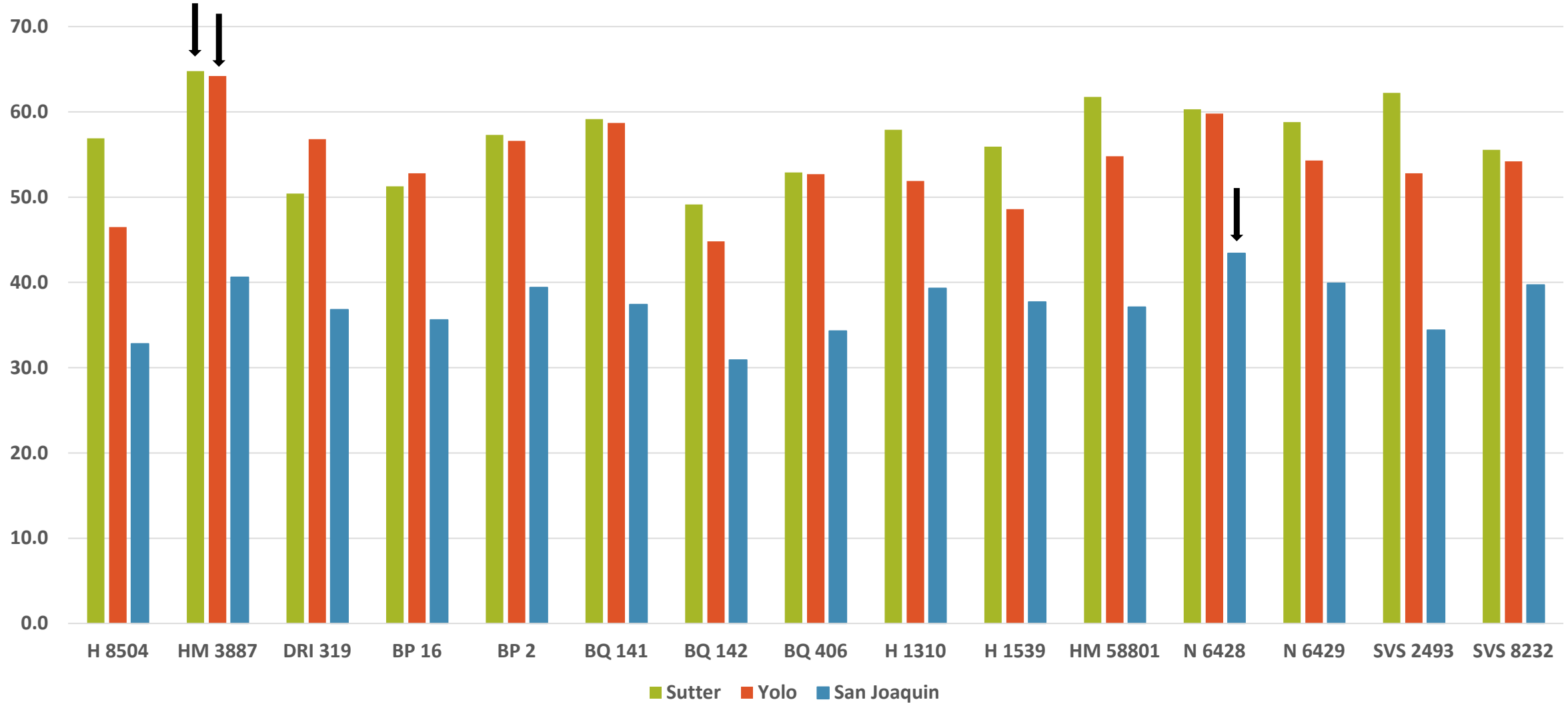
Sutter trial results

Variety	Disease Resistance	Yield tons/A		Fol plants (%)	% vine necrosis	Brix	Color	pH
HM 3887	**tolerant**	**64.8**	**A**	**16.3**	43	5.20	23.5	4.42
SVS 2493	**resistant**	**62.2**	**AB**	0.9	72	5.10	21.5	4.44
HM 58801	**resistant**	**61.8**	**ABC**	0.3	35	5.73	23.8	4.37
N 6428	**resistant**	**60.3**	**ABCD**	0.3	54	5.40	22.0	4.34
BQ 141	resistant	59.2	BCD	0.3	57	5.05	21.3	4.38
N 6429	resistant	58.8	BCD	0.0	65	5.55	22.5	4.39
BP 2	resistant	57.3	BCDE	0.0	57	5.43	21.0	4.47
H 1310	resistant	57.9	BCDE	0.3	35	5.38	21.3	4.40
H 8504	**susceptible**	**56.9**	**CDE**	**23.7**	61	5.03	22.0	4.28
SVS 8232	resistant	55.5	DEF	0.0	61	5.50	20.5	4.33
H 1539	resistant	55.9	DEF	0.3	43	5.03	20.5	4.41
BQ 406	**resistant**	**52.9**	**EFG**	0.0	54	5.50	20.8	4.44
BP 16	**resistant**	**51.3**	**FG**	3.2	65	5.68	22.8	4.33
DRI 319	**tolerant**	**50.4**	**G**	**23.7**	72	**6.28**	22.8	4.35
BQ 142	**resistant**	**49.1**	**G**	0.0	50	5.68	21.3	4.40
Average		57.0		4.6	54.9	5.4	21.8	4.4

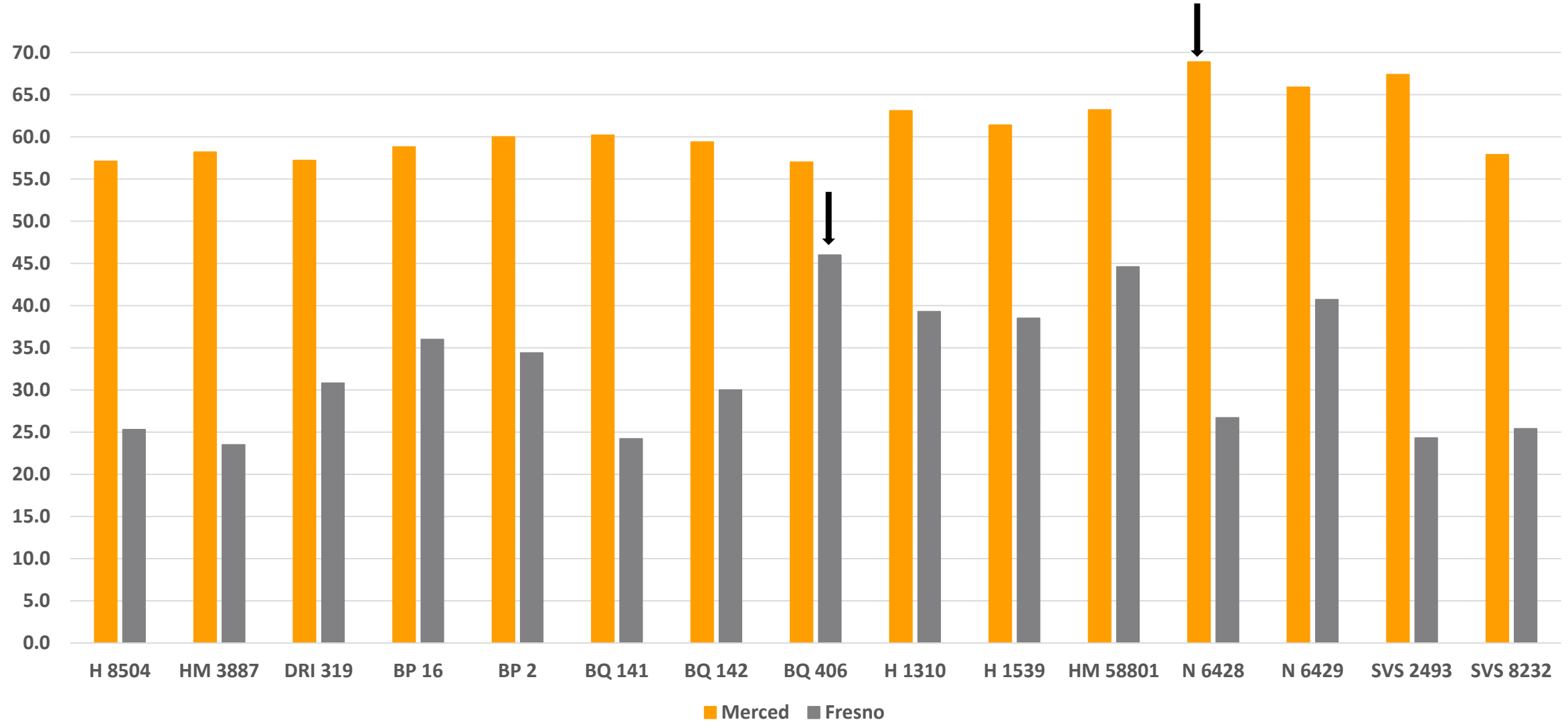
Yolo trial results

Variety	Disease Resistance	Yield tons/A		Fol plants (%)	% vine necrosis	Brix	Color	pH
HM 3887	**tolerant**	**64.2**	**A**	**13.0**	46	4.93	26.5	4.46
N 6428	**resistant**	**59.8**	**AB**	0.0	35	4.73	24.3	4.47
BQ 141	resistant	58.7	BC	0.0	35	4.58	22.3	4.52
DRI 319	**tolerant**	**56.8**	**BCD**	**7.3**	35	5.35	23.3	4.44
BP 2	resistant	56.6	BCD	0.0	54	4.73	22.8	4.63
HM 58801	resistant	54.8	CD	0.0	21	5.38	24.3	4.49
N 6429	resistant	54.3	CD	0.0	76	4.58	24.3	4.58
SVS 8232	resistant	54.2	CD	0.0	61	5.25	22.0	4.48
BP 16	resistant	52.8	DE	0.0	43	4.83	24.0	4.51
SVS 2493	resistant	52.8	DE	0.0	72	4.78	22.8	4.54
BQ 406	resistant	52.7	DE	0.3	43	5.00	22.5	4.55
H 1310	resistant	51.9	DE	0.0	65	4.58	24.0	4.50
H 1539	**resistant**	**48.6**	**EF**	0.2	75	4.78	21.8	4.55
H 8504	**susceptible**	**46.5**	**F**	**19.7**	87	4.53	24.8	4.42
BQ 142	**resistant**	**44.8**	**F**	1.3	61	4.88	22.3	4.55
Average		54.0				4.86	23.4	4.51

Northern sites: Sutter, Yolo, San Joaquin



Southern sites: Merced and Fresno



Conclusions

- Results from northern sites suggest that some varieties with only tolerance to Fusarium wilt, race 3 perform well (HM 3887)
  - N 6428 was also in the highest yielding group and is race 3 resistant
- Variety performance influenced by environmental factors
  - No single variety will be top performer under wide range of conditions
- Resistant varieties performed well under disease pressure compared to susceptible (H 8504)
- The risk of continuing to rely on tolerant varieties when disease pressure reaches a high level is not recommended

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Thank you!