Evaluation of fungicides for control of powdery mildew (*Leveillula taurica*) on tomato, 2011

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This study was conducted within a commercial fresh market tomato field (cv. QualiT-21) located in French Camp, CA. The field was transplanted on July 15th, 2011 and drip-irrigated. Each plot consisted of a single 84-in bed with a double plant row and plots measured 35 ft long. The experimental design was a randomized complete block design with four replications. The trial area was managed by the grower similarly to the rest of the field except that no sulfur or mildew fungicides were applied to the test area. However, fungicides were applied by the grower for prevention of late blight and blackmold fruit rot. Experimental fungicide applications were initiated on September 2nd and continued on a 14- day interval for a total of three applications. At the time of the initial application, there were no symptoms of powdery mildew in the field; however symptoms were noted very shortly thereafter. In one treatment (#15), applications were purposefully delayed until after disease symptoms were first observed. In the results table, letters following the product name indicate the application timings (A = Sep-2, B = Sep-16, C = Sep-30). All applications were made with a CO_2 backpack sprayer (operating at 32 to 34 psi) and a handheld boom with four hollow cone nozzles, two of which were on drops. All applications included a non-ionic surfactant adjuvant (0.25% Latron B-1956) with the exception of treatment 8 (no adjuvant) and Vivando applications (included 0.25% crop oil concentrate). Spray volumes were equivalent to 45 gallons per acre. Mildew severity and crop health were evaluated throughout September and early October. Plots were rated for the percentage of the foliage that was affected by mildew using a 10-point pre-transformed rating scale. A few leaves with necrotic flecks were observed, but their occurrence appeared to be random and not attributable to any particular treatment. Pox and gold flecking did occur on some fruit, but these disorders are not associated with spray damage and were found throughout the trial area. All products/programs significantly reduced mildew severity as rated on September 30th when the disease was most severe. The most effective materials were Quintec, Priaxor (by itself or alternated with Vivando), Quadris Top, Mettle and Torino. On October 10th and 11th, a 6-ft section of each plot was hand-harvested and sorted for defects (sunburn and other culls). Yield and incidence of fruit sunburn did not vary significantly between treatments.

Table 1. Impact of fungicides on disease and yield of fresh market tomatoes, field trial 2011

entry #	Product(s) and rate per acre (application timings)	active ingredient oz per acre	FRAC code	Powdery mildew severity (% foliage affected) 16-Sep	30-Sep	6-Oct	Fruit weight (ton/a)	Fruit sunburn (% incidence by weight)
1	non-treated control #1	---		10.0 a	61.3 a	46.3 a	36.73	5.9%
24	non-treated control #2		---	10.0 a	61.3 a	46.3 a	33.27	6.7%
21	Regalia 0.5% (AB) fb. Quadris Top 8 oz (C)	1.44 fl oz extract of *R. sachalinensis* fb. 1.67 azoxystrobin + 1.05 oz difenoconazole	biological fb. 11 + 3	8.1 ab	42.5 b	39.0 ab	33.53	5.8%
6	Fontelis 16 oz (ABC)	3.34 oz penthiopyrad	7	8.1 ab	35.3 bcd	35.5 abc	34.79	2.4%
8	Acanto 12 oz no adjuvant (ABC)	3.12 oz picoxystrobin	11	8.1 ab	31.8 bcd	35.5 abc	34.56	6.4%
13	Sonata 4 qt (ABC)	1.7 oz *Bacillus subtilis* strain QST 2808	biological	8.1 ab	42.8 b	35.3 abc	31.53	6.4%
23	Microthiol Disperss 20 lb (ABC)	256 oz micronized sulfur	NA	6.3 abc	30.9 bcd	32.8 abc	29.30	7.3%
5	Fontelis 24 oz (ABC)	5 oz penthiopyrad	7	4.4 bc	38.8 bc	31.5 abc	34.22	8.5%
15	Torino 3.4 oz post-infection only (BC)	0.36 oz cyflufenamid	U6	10.0 a	28.0 cde	29.0 bcd	34.33	7.0%
19	Rally 4 oz (ABC)	1.6 oz myclobutanil	3	4.4 bc	28.0 cde	25.5 bcde	30.33	8.1%
10	Q8Y78 18 oz (ABC)	3 oz penthiopyrad + 1.5 oz picoxystrobin	7 + 11	4.4 bc	21.8 defg	24.5 bcdef	33.45	5.2%
17	Mettle 6 oz (ABC)	0.75 oz tetraconazole	3	4.4 bc	24.5 def	22.8 bcdef	32.62	11.6%
7	Acanto 6 oz (ABC)	1.56 oz picoxystrobin	11	8.1 ab	28.0 cde	21.8 cdef	33.94	5.6%
9	Acanto 12 oz (ABC)	3.12 oz picoxystrobin	11	8.1 ab	21.8 defg	21.8 cdef	35.36	5.7%
20	Inspire Super 7 oz** (ABC)	0.64 oz difenoconazole + 1.83 oz cyprodinil	3 + 9	6.3 abc	25.5 cde	20.0 cdefg	32.13	4.7%
18	Mettle 4 oz (ABC)	0.5 oz tetraconazole	3	6.3 abc	21.8 defg	19.0 cdefgh	33.59	8.1%
12	Priaxor 8 oz (AC) alt. w/ Vivando 15 oz (B)	1.39 oz fluxapyroxad + 2.78 oz pyraclostrobin alt. w/ 4.69 oz metrafenone	7 + 11 alt. w/ U8	4.4 bc	10.9 fgh	13.6 defghi	28.44	7.2%
14	Torino 3.4 oz (ABC)	0.36 oz cyflufenamid	U6	4.4 bc	9.0 gh	10.9 efghi	31.47	3.1%
16	Mettle 8 oz (ABC)	1 oz tetraconazole	3	2.5 c	15.5 efgh	10.9 efghi	36.19	6.6%
22	Quadris Top 8 oz (ABC)	1.67 oz azoxystrobin + 1.05 oz difenoconazole	11 + 3	4.4 bc	10.9 fgh	8.1 fghi	31.82	6.5%
11	Priaxor 8 oz (ABC)	1.39 oz fluxapyroxad + 2.78 oz pyraclostrobin	7 + 11	2.5 c	6.3 h	4.4 ghi	29.93	7.9%
4	Quintec 4 oz (ABC)	1 oz quinoxyfen	13	2.5 c	6.3 h	2.5 hi	34.76	8.4%
2	Quintec 12 oz (ABC)	3 oz quinoxyfen	13	2.5 c	6.3 h	1.9 i	31.50	7.9%
3	Quintec 8 oz (ABC)	2 oz quinoxyfen	13	4.4 bc	2.5 h	1.3 i	30.91	5.6%
		Mean		5.9	25.5	22.5	32.86	6.6%
		LSD (0.05%)		4.6	14.1	16.6		
		CV (%)		54.65	39.15	52.24	15.86	64.4%
		P value		0.0028	< 0.0001	< 0.0001	NS	NS

** Inspire Super was mistakenly applied at well-below the labeled rates of 16 to 20 oz

Means followed by the same letters are not significantly different according to Fisher's Protected Least Significant Difference Test (P = 0.05)

NS = not statistically significant