

# Powdery mildew control evaluations on melon and tomato

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# Powdery mildew on cantaloupe

*Sphaerotheca fuliginea* (= *Podosphaera xanthii*) *Oidium*



W. Gärtel

# Melon Powdery Mildew

- Overwinter on weeds
- Airborne spores
- Infection is favored by high humidity (45 to 90%)
- Disease is favored by vigorous plant growth and moderate temperatures.
- Several Races have been identified in CA

# Mention of Pesticides Here is NOT a Recommendation

- Materials may not be registered on crop mentioned or pre-harvest, re-entry or replant restrictions may exist that could be limiting in some situations.
- Carefully read all current labels before writing a pesticide recommendation.

# Fungicides Evaluated

FRAC Code	Group Name	Trade Names (common names)	Resistance Potential
<b>3</b>	DeMethylation Inhibitors (DMI)	<i>Mettle (tetraconazole), Rally (myclobutanil)</i>	Medium
<b>7</b>	Succinate dehydrogenase inhibitor (SDHI)	<i>Endura (boscalid) Fontelis (penthiopyrad)</i>	Medium
<b>11</b>	Quinone outside Inhibitors (Q <sub>o</sub> I) or Strobilurins	<i>Cabrio (pyraclostrobin), Flint (trifloxystrobin), Quadris (azoxystrobin), Sovran (kresoxymethyl)</i>	High
<b>13</b>	Quinolines	Quintec (quinoxifen)	Medium
<b>F6</b>	Microbial ( <i>Bacillus spp.</i> )	Sonata ( <i>Bacillus pumilus</i> (QST 2808))	Low
<b>M2</b>	Inorganic – Sulfur	<i>Various</i>	Low
<b>U6</b>	Phenylacetamid	Torino (cyflufenamid)	Manage resistance
<b>U8</b>	Benzophenone	Vivando (metrafenone)	

# Fungicides Evaluated – (pre-mixed formulations)

FRAC Codes	Group Name	Trade Names (common names)	Resistance Potential
<b>11 and 7</b>	Quinone outside Inhibitors (Q <sub>o</sub> I) + Succinate dehydrogenase inhibitor (SDHI)	Merivon and Priaxor (pyraclostrobin + fluxapyroxad), Luna Sensation (trifloxystrobin + fluopyram), Pristine (pyraclostrobin + boscalid)	High + Medium
<b>11 and 3</b>	Q <sub>o</sub> I + DeMethylation Inhibitors (DMI)	Quadris Top (azoxystrobin + difenoconazole)	High + Medium
<b>3 and 7</b>	DMI + SDHI	Aprovia Top (denzovindiflupyr + difenoconazole)	Medium + Med
<b>3 and 40</b>	DMI + carboxilic acid amides	Revus Top (difenoconazole + mandipropamid)	Medium + Low to Med
<b>3 and 9</b>	DMI + Anilo-Pyrimidines	Inspire Super (difenoconazole + cyprodinil)	Medium + Med

2016	Severity rating (0-10) <sup>y</sup>										
	9 Sep <sup>x</sup>			16 Sep				24 Sep			
	upper	lower		upper	lower		upper	lower			
<b>Torino 3.4 fl oz and Mettle 8.0 fl oz (Dyne-Amic 0.25%)</b>	0.01	d	0.00	0.03	d	0.00	c	0.00	d	0.00	e
<b>Torino 3.4 fl oz (Dyne-Amic 0.25%)</b>	0.01	d	0.00	0.01	d	0.00	c	0.02	d	0.01	e
<b>Rally 40WSP 4.0 oz/ac (Protyx 0.25%)</b>	0.07	cd	0.00	0.01	d	0.03	c	0.11	d	0.04	e
<b>Mettle 8.0 fl oz (Dyne-Amic 0.25%)</b>	0.19	c-d	0.01	0.12	cd	0.01	c	0.30	cd	0.07	de
<b>Rally 40WSP 4.0 oz/ac (Protyx 0.125%)</b>	0.02	d	0.00	0.11	cd	0.00	c	0.38	b-d	0.13	c-e
<b>Rhyme at 7 fl oz/a</b>	0.05	cd	0.00	0.04	d	0.03	c	0.19	d	0.15	c-e
<b>Rally 40WSP 4.0 oz (PX791 0.25%)</b>	0.04	cd	0.00	0.32	cd	0.11	c	0.54	b-d	0.18	c-e
<b>Aprovia Top 13.5 fl oz</b>	0.12	b-d	0.00	0.01	d	0.04	c	0.33	cd	0.23	c-e
<b>Rally 40WSP 4.0 oz/ac (Protyx 0.0625%)</b>	0.03	d	0.00	0.22	cd	0.06	c	0.17	d	0.32	b-e
<b>Rally 40WSP 4.0 oz/ac (PX791 0.50%)</b>	0.26	a-d	0.01	0.2	cd	0.05	c	0.78	b-d	0.37	b-e
<b>Rally 40WSP 4.0 oz/ac (PX791 0.0625%)</b>	0.26	a-d	0.00	0.24	cd	0.06	c	0.46	b-d	0.42	b-e
<b>Rally 40WSP 4.0 oz/ac</b>	0.07	cd	0.00	0.21	cd	0.06	c	0.50	b-d	0.43	b-e
<b>Merivon 5.5 fl oz (no adjuvant)</b>	0.22	a-d	0.01	0.64	b-d	0.26	bc	1.09	b-d	0.52	b-e
<b>SP2700 foliar applications 11 oz</b>	0.66	ab <sup>w</sup>	0.04	1.33	bc	0.30	bc	2.30	a-c	1.19	b-d
<b>SP2700 foliar applications 22 oz/acre</b>	0.57	a-c	0.03	1.43	bc	0.82	ab	2.59	ab	1.40	bc
<b>Fracture at 36.6 fl oz/a</b>	0.79	a	0.07	1.72	b	0.78	ab	2.61	ab	1.66	b
<b>Untreated</b>	<b>0.89</b>	<b>a</b>	<b>0.04</b>	<b>3.38</b>	<b>a</b>	<b>1.42</b>	<b>a</b>	<b>4.25</b>	<b>a</b>	<b>3.06</b>	<b>a</b>

WSREC: Casaba Golden Beauty; Planted 1 Jul; Treated 24 Aug, 2 & 12 Sep 32 psi, 40 gpa, Activator 0.125%  
 Evaluated 3 times on a scale of 1-10

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	upper	lower	upper	lower	upper	lower					
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<b>Mettle 8.0 fl oz (Dyne-Amic 0.25%)</b>	0.19	c-d	0.01	0.12	cd	0.01	c	0.30	cd	0.07	de
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<b>Untreated</b>	<b>0.89</b>	<b>a</b>	<b>0.04</b>	<b>3.38</b>	<b>a</b>	<b>1.42</b>	<b>a</b>	<b>4.25</b>	<b>a</b>	<b>3.06</b>	<b>a</b>

WSREC: Casaba Golden Beauty; Planted 1 Jul; Treated 24 Aug, 2 & 12 Sep 32 psi, 40 gpa, Activator 0.125%  
 Evaluated 3 times on a scale of 1-10



2011 TREATMENTS	3 October				14 October				25 October			
	upper		lower		upper		lower		upper		lower	
Torino SC 3.4 fl oz	0.00	d	0.03	d	0.03	e	0.03	f	0.00	f	0.00	g
Merivon 5.5 fl oz	0.03	cd	0.03	d	0.13	de	0.10	ef	0.03	f	0.00	g
Luna Sensation 4.0 fl oz	0.03	cd	0.10	cd	0.13	de	0.23	de	0.00	f	0.05	g
Rally 5 oz (1), Quintec 4 fl oz (2), Flint 2 oz (3)	0.13	bcd	0.33	bc	0.48	bcde	0.90	bc	0.20	def	0.85	f
Mettle 125ME 8.0 fl oz	0.08	bcd	0.15	cd	0.43	cde	0.58	cd	0.75	cd	0.95	f
Quintec 4 fl oz	0.25	bcd	0.23	bc	0.35	cde	0.48	cd	0.35	cdef	1.05	f
Fontelis LEM SC 24 fl oz	0.28	bcd	0.35	abc	0.23	de	0.65	cd	0.15	ef	1.08	f
Fontelis LEM SC 24 fl oz no surfactant	0.18	bcd	0.38	abc	0.28	cde	0.75	cd	0.65	cde	1.68	ef
Quadris Top 14 fl oz (1,3) Quintec 6 fl oz (2)	0.15	bcd	0.25	bc	0.43	cde	1.23	bc	0.30	cdef	1.88	def
Sonata 3 qt + Quadris Top 14 fl oz	0.45	b	0.50	ab	1.23	bc	1.83	ab	1.03	c	2.98	cde
Quadris Top 14 fl oz	0.18	bcd	0.55	ab	0.68	bcd	1.10	bc	0.90	cd	3.40	cde
Tolfenpyrad 21 fl oz	0.33	bcd	0.30	bc	0.43	cde	1.18	bc	1.08	c	3.60	cd
Rally 5 oz	0.28	bcd	0.28	bc	0.78	bcd	0.88	bc	3.55	b	4.00	c
Quadris Top 14 fl oz (1,3), Sonata 4 qt (2)	0.35	bc	0.38	abc	1.50	b	1.93	ab	2.95	b	5.45	b
Untreated Check	1.43	a	0.88	a	6.75	a	2.68	a	7.05	a	7.08	a

30 gal water w/ 0.125% Activator, unless specified. Applications: 21 Sep, 3 and 17 Oct.

2011 TREATMENTS	3 October				14 October				25 October			
	upper		lower		upper		lower		upper		lower	
Torino SC 3.4 fl oz	0.00	d	0.03	d	0.03	e	0.03	f	0.00	f	0.00	g
Merivon 5.5 fl oz	0.03	cd	0.03	d	0.13	de	0.10	ef	0.03	f	0.00	g
Luna Sensation 4.0 fl oz	0.03	cd	0.10	cd	0.13	de	0.23	de	0.00	f	0.05	g
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Mettle 125ME 8.0 fl oz	0.08	bcd	0.15	cd	0.43	cde	0.58	cd	0.75	cd	0.95	f
Quintec 4 fl oz	0.25	bcd	0.23	bc	0.35	cde	0.48	cd	0.35	cdef	1.05	f
Fontelis LEM SC 24 fl oz	0.28	bcd	0.35	abc	0.23	de	0.65	cd	0.15	ef	1.08	f
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30 gal water w/ 0.125% Activator, unless specified. Applications: 21 Sep, 3 and 17 Oct.  
 Excellent control from Torino and two currently unavailable materials.

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Torino SC 3.4 fl oz	0.00	d	0.03	d	0.03	e	0.03	f	0.00	f	0.00	g
Merivon 5.5 fl oz	0.03	cd	0.03	d	0.13	de	0.10	ef	0.03	f	0.00	g
Luna Sensation 4.0 fl oz	0.03	cd	0.10	cd	0.13	de	0.23	de	0.00	f	0.05	g
Rally 5 oz (1), Quintec 4 fl oz (2), Flint 2 oz (3)	0.13	bcd	0.33	bc	0.48	bcde	0.90	bc	0.20	def	0.85	f
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Quadris Top 14 fl oz (1,3), Sonata 4 qt (2)	0.35	bc	0.38	abc	1.50	b	1.93	ab	2.95	b	5.45	b
Untreated Check	1.43	a	0.88	a	6.75	a	2.68	a	7.05	a	7.08	a

30 gal water w/ 0.125% Activator, unless specified. Applications: 21 Sep, 3 and 17 Oct.  
Treatments that consistently provided acceptable levels of control.

2008 TREATMENTS	3 October			
	upper		lower	
Sovran 50WDG 4.8 oz + Endura 70WG 6.5 oz	0.22	b	0.24	c
Microthiol Disperss 80W 5 lb	0.38	b	0.30	c
Quadris 2.08F 15.4 fl oz + KTS 1.0 gal	0.30	b	0.32	c
Inspire Super MP 14 fl oz	0.26	b	0.34	c
Microthiol Disperss 80W 5 lb (1)/Topsin M70W 0.5 lb + Microthiol Disperss 80W 5 lb (2,3)	0.40	b	0.34	c
Endura 70WDG 6.5 oz	0.16	b	0.38	c
Quadris 2.08F 15.5 fl oz + KBS 2 gal	0.40	b	0.40	bc
Procure 480SC 4 fl oz + Quintec 250SC 4 fl oz	0.27	b	0.44	bc
V-10118 0.4EC 9.37 fl oz	0.28	b	0.52	bc
Sovran 50WDG 4.8 oz	0.46	b	0.58	bc
Procure 480SC 8 fl oz	0.42	b	0.60	bc
Inspire Super MP 20 fl oz	0.56	b	0.68	bc
Rally 40W 5 oz	0.45	b	0.72	bc
Procure 480SC 8 fl oz (1,3)/Quintec 250SC 6 fl oz (2)	0.30	b	0.70	bc
Quadris 2.08F 15.4 fl oz	0.58	b	0.90	bc
Quintec 250SC 6 fl oz	1.38	a	1.56	b
Untreated	1.60	a	3.06	a

30 gal water w/ 0.125% Induce. Applications: 21 Sep, 3 and 17 Oct. 26 Aug, 3 and 12 Sep.  
Infection was widespread and severe at the time of the first application.

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	upper		lower	
Sovran 50WDG 4.8 oz + Endura 70WG 6.5 oz	0.22	b	0.24	c
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Untreated	1.60	a	3.06	a

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Quintec performance ranked much lower when used curative.

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Quadris 2.08F 15.4 fl oz + KTS 1.0 gal	0.40	b	0.40	bc	
Procure 480SC 8 fl oz	FIRST APPLICATION AFTER DISEASE WAS PRESENT AT MODERATE LEVELS			0.44	bc
V-10118 0.4EC 9.37 fl oz	0.28	b	0.52	bc	
Sovran 50WDG 4.8 oz	0.46	b	0.58	bc	
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# Powdery mildew fungicides

- Sulfur dust (or wettable sulfur) – careful at high temps, avoid on cucurbits without sulfur tolerance
- Quadris Top (3 + 11)
- Quadris, Cabrio, Flint (11) Resistance is common
- Rally, Procure (3)
- Priaxor (7 + 11)
- Fontelis (7)
- Quintec (13)
- Merivon, Pristine (7 +11)
- Luna Sensation (7 +11) –registration for watermelon only
- Torino (U6)

# Melon Powdery Mildew Resistance Evaluation 2012-13: Epstein

- Field samples were submitted from Central CA production areas (12).
- Bio assay evaluations indicate:
  - 12/12 resistant to Benlate
  - 10/12 resistant to Flint and Quadris
  - No resistance to Rally or Procure
  - No resistance to Endura

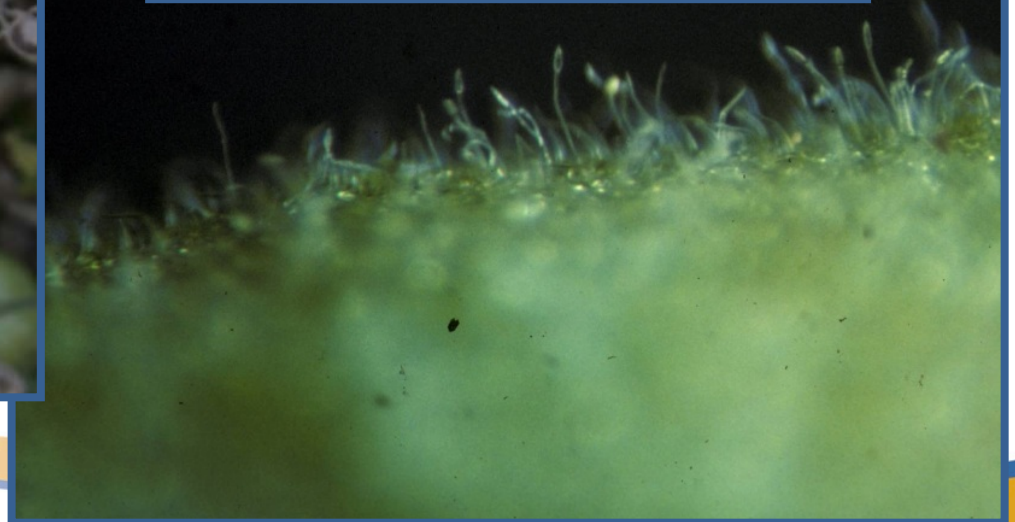


# Melon Powdery Mildew: Main Points

- Rotate materials with different MOA (FRAC Code Numbers).
  - Sulfur, Quintec, Torino, Fontelis, Quadris Top, Procure, Pristine
  - Quintec is an excellent material with unique MOA, but do not use after disease is widespread
- There is evidence of Q<sub>0</sub>I (strobilurin; Cabrio, Flint and Quadris) resistance in the Central San Joaquin Valley in melon PM

# Tomato Powdery Mildew

*Leveillula taurica* (*Oidiopsis sicula*)



# Factors Influencing Management

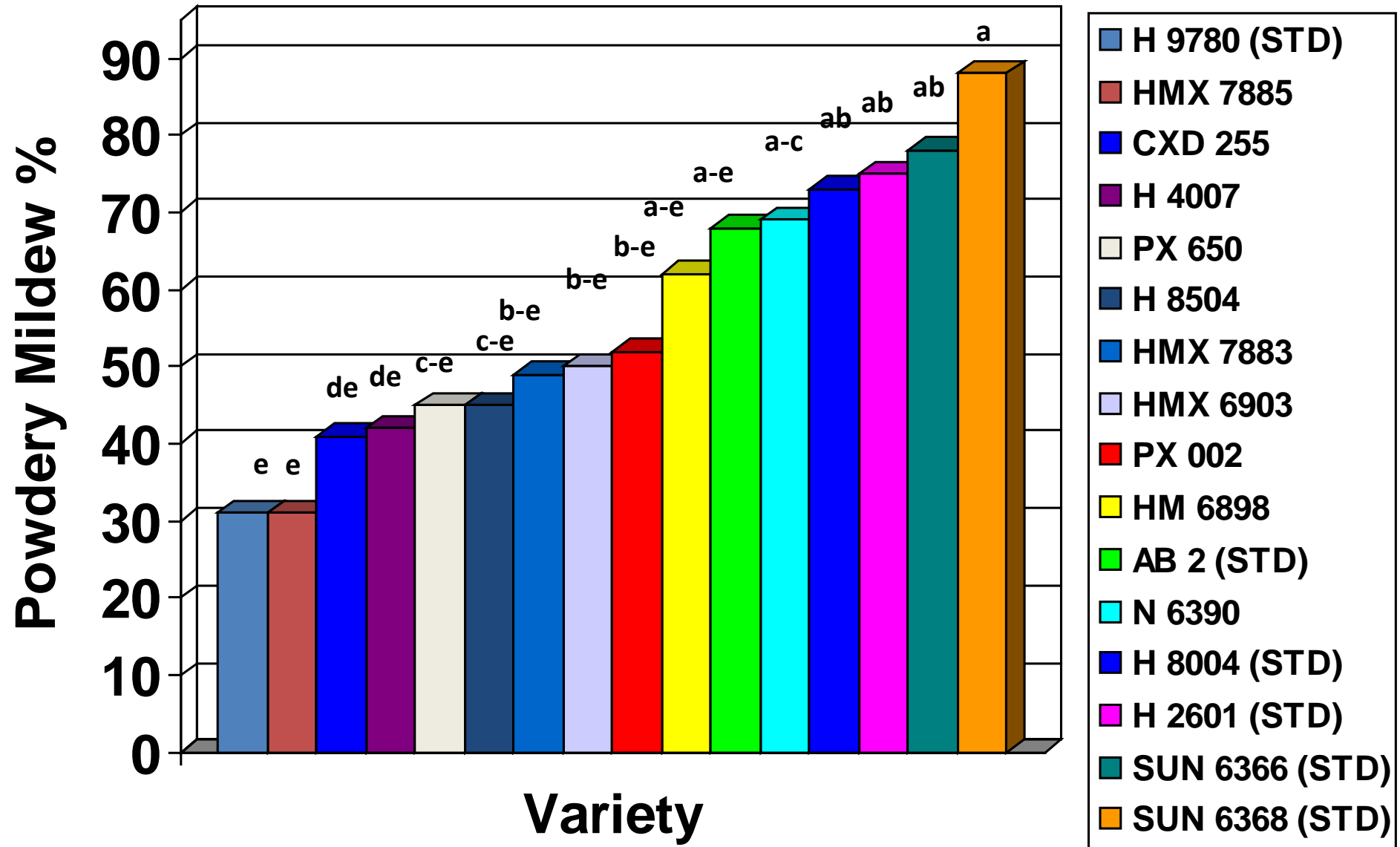
- Environmental conditions:
  - wide range of temperatures (10-30°C)
  - favored by high relative humidity

# Factors Influencing Management

- Environmental conditions:
  - wide range of temperatures (10-30°C)
  - favored by high relative humidity
- No immunity in common commercial tomato varieties

# Comparison of processing tomato variety susceptibility to powdery mildew 28 Aug

Transplanted 22 May



# Factors Influencing Management

- Environmental conditions:
  - wide range of temperatures (10-30°C)
  - favored by high relative humidity
- No immunity in tomato varieties
- Managed with fungicide programs

# Powdery Mildew Fungicides

FRAC Code	Group Name	Trade Names (common names)	Resistance Potential
<b>3</b>	DeMethylation Inhibitors (DMI)	<i>Mettle (tetraconazole), Procure (triflumizole), Rally (myclobutanil)</i>	Medium
<b>7</b>	Succinate dehydrogenase inhibitor (SDHI)	<i>Endura (boscalid) Fontelis (penthiopyrad)</i>	Medium
<b>11</b>	Quinone outside Inhibitors (Q <sub>o</sub> I) or Strobilurins	<i>Cabrio (pyraclostrobin), Flint (trifloxystrobin), Quadris (azoxystrobin),</i>	High
<b>13</b>	Quinolines	Quintec (quinoxifen)	Medium
<b>F6</b>	Microbial ( <i>Bacillus spp.</i> )	Sonata ( <i>Bacillus pumilus</i> (QST 2808))	Low
<b>M2</b>	Inorganic – Sulfur	<i>Various</i>	Low
<b>M5</b>	Chloronitriles (phalonitriles)	<i>Various (chlorothanlonil)</i>	Low
<b>U6</b>	Phenylacetamid	Torino (cyflufenamid)	Manage resistance
<b>U8</b>	Benzophenone	Vivando (metrafenone)	



# Powdery mildew fungicides– (pre-mixed formulations)

FRAC Codes	Group Name	Trade Names (common names)	Resistance Potential
<b>11 and 7</b>	Quinone outside Inhibitors (Q <sub>o</sub> I) + Succinate dehydrogenase inhibitor (SDHI)	Merivon and Priaxor (pyraclostrobin + fluxapyroxad), Luna Sensation (trifloxystrobin + fluopyram), Pristine (pyraclostrobin + boscalid)	High + Medium
<b>11 and 3</b>	Q <sub>o</sub> I + DeMethylation Inhibitors (DMI)	Quadris Top (azoxystrobin + difenoconazole)	High + Medium
<b>3 and 40</b>	DMI + carboxilic acid amides	Revus Top (difenoconazole + mandipropamid)	Medium + Low to Med
<b>3 and 9</b>	DMI + Anilo-Pyrimidines	Inspire Super (difenoconazole + cyprodinil)	Medium + Med



2016	Severity rating (0-10) <sup>y</sup>		Severity rating (0-10) <sup>y</sup>	
	1 Sep		9 Sep	
Torino 3.4 fl oz and Mettle 8.0 fl oz (Dyne-Amic 0.25%)	0.27	c	0.40	e
Quadris Top 8 fl oz (1), Quintec 4 fl oz (2), Quadris Top 8 fl oz (3)	0.30	c	0.47	de
Fontelis® 20 floz/ac + Rally 40WSP 4.0 oz/ac (1,3) Quintec 6.0 floz/ac (2)	0.32	c	0.49	de
Aprovia Top 10.5 fl oz (1), Quintec 4 fl oz (2), Aprovia Top 10.5 fl oz (3)	0.27	c	0.49	de
Torino 3.4 fl oz (Dyne-Amic 0.25%)	0.39	bc	0.49	de
Quintec 4.0 fl oz	0.19	c	0.52	de
Priaxor 8 fl oz	0.22	c	0.54	de
Mettle 8.0 fl oz (Dyne-Amic 0.25%)	0.24	c	0.69	de
A20259E 13.7 fl oz (1), Quintec 4 fl oz (2), A20259E 13.7 fl oz (3)	0.61	a-c	0.84	c-e
Rhyme at 7 fl oz/a	0.49	a-c	1.06	c-e
Fontelis® 20 floz + Microthiol Disperss 2.5 lb (1,3) with Quadris Top 8.0 floz (2)	0.52	a-c	1.07	c-e
Fontelis® 20 floz/ac + Rally 40WSP 4.0 oz/ac (1,3) with Quadris Top 8.0 floz/ac (2)	0.54	a-c	1.09	c-e
Rally 40WSP 4.0 oz/ac (PX791 0.50%)	0.55	a-c	1.12	c-e
Rally 40WSP 4.0 oz/ac (PX791 0.25%)	0.54	a-c	1.32	cd
Rally 40WSP 4.0 oz/ac	0.80	a-c	1.74	bc
SP 2700 transplant drench at equivalent of 22 oz/acre and SP2700 foliar applications 22 oz/acre at 7 day intervals	0.65	a-c	1.74	bc
Rally 40WSP 4.0 oz/ac (PX791 0.0625%)	0.81	a-c	1.82	bc
Fracture at 36.6 fl oz/a	1.19	ab	2.44	ab
SP 2700 transplant drench at equivalent of 11 oz/acre and SP2700 foliar applications 11 oz/acre	1.33	a	2.80	a
Untreated	1.37	a	2.98	a

All treatments were applied on 29 July, 10 and 24 Aug. If the material is followed by (1) it was applied on the 29 July, those followed by (2) were applied on 10 Aug, and those followed by (3) were applied on 24 Aug.. Unless specified in parenthesis, all materials were applied with 0.125% Activator. Fracture and SP2700 were also applied on 4 and 18 Aug.

2016	Severity rating (0-10) <sup>y</sup>		Severity rating (0-10) <sup>y</sup>	
	1 Sep		9 Sep	
Torino 3.4 fl oz and Mettle 8.0 fl oz (Dyne-Amic 0.25%)	0.27	c	0.40	e
Quadris Top 8 fl oz (1), Quintec 4 fl oz (2), Quadris Top 8 fl oz (3)	0.30	c	0.47	de
Fontelis® 20 floz/ac + Rally 40WSP 4.0 oz/ac (1,3) Quintec 6.0 floz/ac (2)	0.32	c	0.49	de
Aprovia Top 10.5 fl oz (1), Quintec 4 fl oz (2), Aprovia Top 10.5 fl oz (3)	0.27	c	0.49	de
Torino 3.4 fl oz (Dyne-Amic 0.25%)	0.39	bc	0.49	de
Quintec 4.0 fl oz	0.19	c	0.52	de
Priaxor 8 fl oz	0.22	c	0.54	de
Mettle 8.0 fl oz (Dyne-Amic 0.25%)	0.24	c	0.69	de
A20259E 13.7 fl oz (1), Quintec 4 fl oz (2), A20259E 13.7 fl oz (3)	0.61	a-c	0.84	c-e
Rhyme at 7 fl oz/a	0.49	a-c	1.06	c-e
Fontelis® 20 floz + Microthiol Disperss 2.5 lb (1,3) with Quadris Top 8.0 floz (2)	0.52	a-c	1.07	c-e
Fontelis® 20 floz/ac + Rally 40WSP 4.0 oz/ac (1,3) with Quadris Top 8.0 floz/ac (2)	0.54	a-c	1.09	c-e
Rally 40WSP 4.0 oz/ac (PX791 0.50%)	0.55	a-c	1.12	c-e
Rally 40WSP 4.0 oz/ac (PX791 0.25%)	0.54	a-c	1.32	cd
Rally 40WSP 4.0 oz/ac	0.80	a-c	1.74	bc
SP 2700 transplant drench at equivalent of 22 oz/acre and SP2700 foliar applications 22 oz/acre at 7 day intervals	0.65	a-c	1.74	bc
Rally 40WSP 4.0 oz/ac (PX791 0.0625%)	0.81	a-c	1.82	bc
Fracture at 36.6 fl oz/a	1.19	ab	2.44	ab
SP 2700 transplant drench at equivalent of 11 oz/acre and SP2700 foliar applications 11 oz/acre	1.33	a	2.80	a
Untreated	1.37	a	2.98	a

All treatments were applied on 29 July, 10 and 24 Aug. If the material is followed by (1) it was applied on the 29 July, those followed by (2) were applied on 10 Aug, and those followed by (3) were applied on 24 Aug.. Unless specified in parenthesis, all materials were applied with 0.125% Activator. Fracture and SP2700 were also applied on 4 and 18 Aug.

FIVE POINTS-AREA TRIAL		2009					
		Foliage affected by mildew (%)				Necrosis rating	
		2-Sept				4-Sept	
Treatments	Applications	basal		terminal			
Quadris/Rally, 7 day interval, 6-26 to 8/27	10	31.0	c	13.8	c	1.5	c
Quadris/Rally, 7 day, late, 7/30 to 8/27 -	5	38.0	c	15.0	c	2.0	bc
Sulfur 7 day, 7/2 to 8/13	7	13.8	e	17.8	c	1.0	c
Quadris/Rally, 14 day interval, 7/2 to 8/27	5	50.3	b	28.3	bc	3.3	b
Quadris/Rally, 7 day, early, 7/2 to 8/6	6	26.5	d	49.3	b	2.8	b
Nontreated control	0	96.3	a	86.8	a	7.5	a
LSD 5%		11.8		19.8		1.2	
CV (%)		18.4		37.5		27.0	

FIVE POINTS-AREA TRIAL		2009					
		Foliage affected by mildew (%)				Necrosis rating	
		2-Sept				4-Sept	
Treatments	Applications	basal		terminal			
Quadris/Rally, 7 day interval, 6-26 to 8/27	10	31.0	c	13.8	c	1.5	c
Quadris/Rally, 7 day, late, 7/30 to 8/27 -	5	38.0	c	15.0	c	2.0	bc
Sulfur 7 day, 7/2 to 8/13	7	13.8	e	17.8	c	1.0	c
Quadris/Rally, 14 day interval, 7/2 to 8/27	5	50.3	b	28.3	bc	3.3	b
Quadris/Rally, 7 day, early, 7/2 to 8/6	6	26.5	d	49.3	b	2.8	b
Nontreated control	0	96.3	a	86.8	a	7.5	a
LSD 5%		11.8		19.8		1.2	
CV (%)		18.4		37.5		27.0	

2009 Treatments (22, 31 Jul, 12 and 21 Aug)	Foliage with powdery mildew (%)				Necrosis rating			
	22 Aug		1 Sep		25 Aug		2 Sep	
Luna Sensation 7.6 fl oz+Dyne-Amic (D)	5.3	c	13.3	b	1.5	ef	2.0	c
Quadris Top 8 fl oz + D	5.8	c	18.5	b	1.3	f	1.8	c
Quadris Top 8 1 oz + D (1,3) Bravo Weather Stik 2.75 pt (2,4)	15.0	c	21.8	b	2.8	cde	3.3	c
Torino 3.4 oz + D	11.0	c	22.5	b	1.3	f	2.0	c
Vivando 15 fl oz + Widespread Max 0.03%	17.0	c	45.8	a	2.0	def	3.3	c
Cabrio 16 oz + D (1,3) Rally 4 oz/A + D (2,4)	34.3	b	49.8	a	3.3	bcd	5.0	b
Cabrio 16 oz + Franchise 0.25% (1,3) Rally at 4 oz + Widespread Max 0.03 % (2,4)	38.0	b	53.8	a	4.0	bc	6.5	ab
Flint 3.0 oz + D	39.8	b	60.5	a	3.8	bcd	5.5	b
Cabrio 16 oz + Franchise 0.13% (1,3) <sup>u</sup> Rally at 4 oz/A + Widespread Max 0.03% (2, 4)	33.8	b	61.8	a	3.5	bcd	5.0	b
Regalia at 0.5% + Cabrio 8 oz + D	42.3	b	62.5	a	3.5	bcd	5.8	b
Regalia 0.5% + Rally 2.5 oz + D	37.3	b	63.0	a	3.7	bc	5.8	ab
Microthiol 10.0 lb	50.5	ab	65.0	a	2.8	bcde	6.3	ab
Regalia 1.0% + D	59.0	ab	67.5	a	4.8	ab	7.8	ab
Bravo Weather Stik 2.75 pt	59.0	ab	70.3	a	4.8	ab	7.3	ab
Untreated Control	70.3	ab	74.3	a	6.0	a	8.8	a





and harvest of 15 ft x 66 in bed on  
Sep 2009



# Fungicide Efficacy, Yield and Quality

FIVE POINTS-AREA TRIAL		FRUIT YIELD AND QUALITY				
Fungicides		Marketable yield (tons)	Sunburn (%)	PTAB color	Soluble solids (°Bx)	pH
Quadris Top 8 fl oz + Dyne-Amic 0.25%		41.3	6.1	27.8	4.8	4.378
Quadris Top 8 fl oz + Dyne-Amic 0.25% (1,3) alt. Bravo Weather Stick 2.75 pt (2,4)		33.7	13.7	32.0	4.7	4.368
Cabrio 16 oz+DyneAmic 0.25% (1,3) Rally 4 oz+ DyneAmic 0.25% (2,4)		30.8	11.5	32.0	4.9	4.415
Cabrio 16 oz+Franchise 0.13% (1,3) Rally 4 oz Widespread Max 0.03 (2,4)		27.9	22.1	33.5	4.6	4.385
Cabrio 16 oz+Franchise 0.25% (1,3) Rally 4 oz Widespread Max 0.03 (2,4)		27.0	17.4	30.3	4.6	4.428
Nontreated control		22.1	29.6	29.8	4.3	4.467
	LSD 5%	6.2	11.8	NS	0.6	0.090
	% CV	14.9	47.0	11.37	8.4	2.63

Yield reduction of 46%

Fungicide  
Comparison  
2015

Treatments (1) = 7 Aug, (2) = 19 Aug and (3) = 31 Aug	Disease severity rating (0-10) <sup>y</sup>						
	12 Aug	21 Sep		27 Sep		5 Sep	
Quadris Top 8 fl oz	0.17	0.19	cd	0.28	d	0.82	d
Quintec 12 fl oz	0.52	0.44	bcd	0.61	cd	0.90	d
Quintec 4 fl oz (1) Aprovia Top 13.5 fl oz (2)	0.42	0.61	bcd	0.72	cd	0.95	d
Priaxor ( BAS 7032) 6 fl oz	0.23	0.35	cd	0.64	cd	1.09	cd
Quintec 6 fl oz	0.36	0.79	bcd	0.92	bcd	1.17	cd
Quintec 4 fl oz	0.55	0.70	bcd	0.84	bcd	1.19	cd
Priaxor ( BAS 7032) 8 fl oz	0.24	0.17	d	0.55	cd	1.41	cd
Fontelis 20 floz/ac + Microthiol Disperss 2.5 lb (1,3), Quadris Top 8.0 fl oz (2)	0.39	0.72	bcd	0.63	cd	1.47	cd
Luna Sensation 7 fl oz	0.35	0.61	bcd	0.59	cd	1.65	cd
Luna Sensation 5 fl oz	0.40	0.49	bcd	0.61	cd	1.92	cd
Mettle 6.5 fl oz	0.28	0.61	bcd	1.44	bc	2.08	bcd
Mettle 8.0 fl oz	0.36	0.54	bcd	1.25	bcd	2.21	bcd
Fontelis 20 floz/ac + Microthiol Disperss 2.5 lb (1,3)Quintec 6.0 flo oz (2)	0.44	1.62	a	1.50	bc	2.22	bcd
Aprovia Top 13.5 fl oz	0.57	0.57	ab	1.05	bcd	2.56	bc
Mettle 5.0 fl oz	0.49	0.89	bc	1.91	b	3.55	b
Untreated Control	0.63	1.74	ab	3.26	a	5.55	a



Fungicide  
Comparison  
2013

Treatments 25 Jul, 5, 16 and 30 Aug	Disease severity rating (0-10) <sup>y</sup>		
	14 Aug	3 Sep	13 Sep
Quintec 4 fl oz	0.78	1.53	3.70
Quintec 12 fl oz	0.73	1.48	3.78
Quintec 6 fl oz	0.75	0.85	4.03
Priaxor 6 fl oz	0.78	2.15	4.18
Priaxor 8 fl oz	0.38	1.95	4.20
Quadris Top 8 fl oz	0.38	1.38	4.50
Luna Sensation 4 fl oz + Sonata 2.0 qts (1), Sonata 3qts (2) Luna Sensation 4.0 oz+ Sonata 2.0 qts (3), Sonata 3 qts (4) <sup>x</sup>	0.75	1.98	4.55
A13703N 8 fl oz	0.43	1.88	4.58
Luna Sensation 5 fl oz (1,3)	0.80	1.70	4.65
A19334A 8.5 fl oz	1.00	2.03	4.71
Quadris Top 8 fl oz (1,3)	0.77	2.80	4.80
A19334A 13 fl oz	0.60	1.68	5.18
Fontelis 1.67SC 1.0 pt (1,3) Quadris Top 8 fl oz (2,4)	1.05	2.40	5.30
Quadris Top 8 fl oz (1), Taegro 5.2 oz (2), Quadris Top 8 fl oz + Taegro 5.2 oz (3), Taegro 5.2 oz (4)	0.73	2.75	5.33
Luna Sensation 5 fl oz (1), Sonata 3qts (2) Luna Sensation 4.0 oz+ Sonata 2.0 qts (3), Sonata 3 qts (4)	0.88	3.08	5.40
Vivando ( BAS 56003) 15 fl oz	1.18	4.05	5.70
Gem 3 oz (1), Sonata 3 qts (2), Gem 2 oz+Sonata 2qts (3),Sonata 3qts (4)	1.00	3.23	5.93
Untreated Control	1.83	6.28	7.10
LSD <sub>0.05</sub> <sup>w</sup>	0.408	1.053	1.395
CV (%)	34.98	30.96	20.20

2012,  
Comparison  
of  
Conventional  
Fungicides

Treatments (24 Jul, 3 and 14 and 30 Aug)	Disease severity rating (0-10) <sup>y</sup>
	6 Sep
Quintec 12 fl oz	0.10
Quintec 6 fl oz	0.33
Quintec 4 fl oz	0.48
Fontelis 1.67SC 1.0 pt/acre (1,3) Quadris Top 8 fl oz + NIS 0.25% v/v (2,4)	0.75
Quadris Top 8 fl oz	1.03
Luna Sensation 5 fl oz	1.45
Torino 3.4 fl oz	1.50
Picoxy 2.08 SC 24 fl oz	1.55
Picoxy 2.08 SC 12 fl oz	1.63
BAS 700 04F 4.5 fl oz/acre + NIS 0.062%	2.08
Mettle at 8 fl oz	2.60
Priaxor 8 fl oz +NIS 0.062%	2.65
Mettle at 4 fl oz	2.70
Torino NO SURFACTANT	2.85
Mettle at 6 fl oz	2.88
Untreated Control	5.25
LSD <sub>0.05</sub> <sup>x</sup>	1.31
CV (%)	49.30

2014

Treatments	Rating (0-10)	
	15 Aug	22 Aug
Luna Sensation 7 fl oz	2.05	0.53
Priaxor at 8 oz/A	2.40	1.50
Quadris Top 8 fl oz	1.38	1.58
A18126B 5.0 oz	2.75	1.65
Luna Sensation 7 fl oz (1) Sonata 2 qts (2)	1.68	2.00
A19334A 13.5 fl oz	2.45	2.08
Fontelis SC 1 pt (1), Quadris Top 8 fl oz (2)	3.55	2.28
Fontelis SC 1.5 pt (1), Quadris Top 8 fl oz (2)	3.35	2.30
Quadris Top 8 fl oz (1), Taegro 5.2 oz (2)	2.50	2.60
Vivando at 15 oz/A + Sylgard 309 6 oz/A	3.03	2.70
A19334A 10.5 fl oz	2.80	2.90
Quintec at 12 fl oz	3.63	3.40
Quintec at 6 fl oz	3.73	3.50
Quintec at 4 fl oz	2.88	3.60
Untreated	4.55	4.13
LSD (p=0.05)	1.561	1.984

# Powdery Management Summary

- Application at early symptom development or before visible provides higher levels of control.
- Materials with several modes of action demonstrated efficacy against powdery mildew: dusting sulfur, Priaxor, Quintec, Quadris Top, Luna Sensation and Mettle
- Quintec is an excellent material used preventative: In the event that disease is relatively severe at the time of the application, use other materials.

# Powdery mildew fungicides

- Sulfur dust (or wettable sulfur)
- Quadris Top (3 + 11)
- Priaxor (7 + 11)
- Fontelis (7)
- Vivando (U8)
- Quintec (13)
- Luna Sensation (7 +11)
- Torino (U6) Not registered
- Mettle (3)

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# Questions

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