

Powdery mildew management in processing tomatoes

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Tomato powdery mildew pathogens

- *Leveillula taurica*
(*Oidiopsis sicula*)
- *Oidium neolycopersici*
- *Oidium lycopersici*



Leveillula taurica
(*Oidiopsis sicula*)



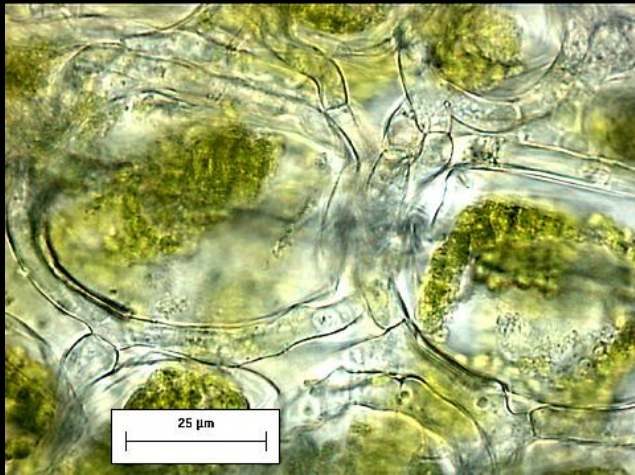






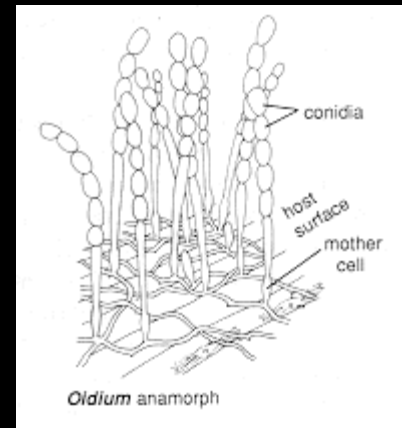






Leveillula Endoparasitic mildew

Extensive fungal mycelium inside
leaf mesophyll



Oidium Ectoparasitic mildew

Fungal mycelium on leaf surface



Leveillula



Oidium

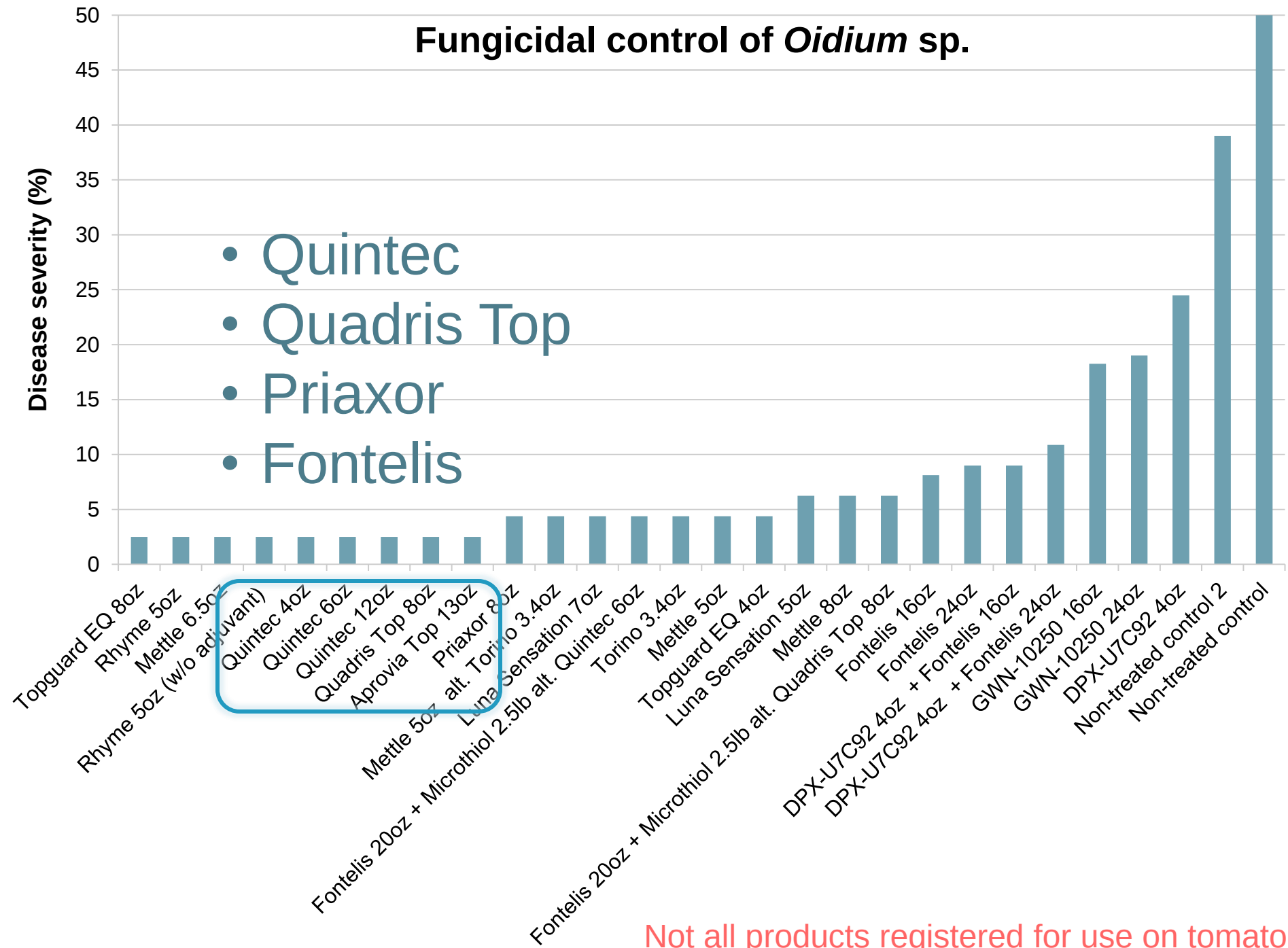
Oidium mildew control

-----Disease severity-----
(percent of foliage affected)

Product	Interval	Sprays	19-Aug	26-Aug	13-Sep	NDVI
Quadris Top	10 day	6	2.5 a	0 a	0.8 a	0.64 a
Quadris	10 day	6	5.0 ab	1.7 a	11.2 a	0.59 ab
Quadris Top	20 day	3	2.5 a	5.0 a	35.3 b	0.60 ab
Quadris	20 day	3	5.0 ab	7.5 a	35.3 b	0.59 ab
Rally	10 day	6	7.5 ab	11.2 a	40.3 b	0.56 b
Cabrio	10 day	6	13.7 bc	19.5 ab	50.0 b	0.56 b
Rally	20 day	3	8.7 ab	15.8 ab	73.3 c	0.49 c
Cabrio	20 day	3	13.7 bc	15.8 ab	82.7 c	0.49 c
Non-treated control		0	22.0 c	35.3 b	92.5 c	0.45 c
Mean			8.94	12.43	46.83	0.552
LSD			10.12	20.52	20.71	0.063
<i>P-value</i>			0.014	0.054	< .0001	0.0002

Fungicidal control of *Oidium* sp.

- Quintec
- Quadris Top
- Priaxor
- Fontelis



Not all products registered for use on tomato

Fungicides via the drip system

Disease control programs evaluated

0.21 lb fluopyram via drip once
~6 wks after transplanting

0.21 lb fluopyram via drip once
~8 wks after transplanting
plus 25 lbs sulfur dust 14-day interval

0.21 lb fluopyram via drip twice
~6 and 10 weeks after transplanting

0.114 lb flutriafol via drip twice
~6 and 10 weeks after transplanting

25 lbs sulfur dust 14-day interval

Non-treated control



Products and use pattern not yet registered

<u>Disease control program</u>	-----Disease severity----- (percent of the foliage affected)			NDVI*		--Fruit quality-- Sunburn Solids (% by wt) (° Brix)	
	19-Aug	28-Aug	17-Sep	17-Sep			
0.21 lb fluopyram via drip once ~8 wks after transplanting plus 25 lbs sulfur dust 14-day interval	22.0ab	25.7 b	7.5a	0.64	a	2.26%	6.20
25 lbs sulfur dust 14-day interval	25.7ab	25.7 b	30.3ab	0.57	ab	1.56%	6.70
0.114 lb flutriafol via drip twice, ~6 and 10 weeks after transplanting	2.5a	5.0a	30.3ab	0.59	ab	0.86%	6.17
0.21 lb fluopyram via drip twice, ~6 and 10 weeks after transplanting	25.7ab	25.7 b	35.3ab	0.58	ab	1.34%	6.03
0.21 lb fluopyram via drip once ~6 wks after transplanting	18.3ab	30.3 b	50.0 b	0.53	bc	3.20%	5.43
Non-treated control	45.0 b	65.0 c	82.7 c	0.46	c	6.04%	5.27
Mean	23.2	29.6	39.4	0.56		2.54%	5.97
CV (%)	43.0	20.2	28.1	4.9		83.2	1.1
<i>P value</i>	0.0097	< 0.0001	0.0002	0.0002		NS	NS

* NDVI = Normalized difference vegetation index, which is a measure of photosynthetically active (live, green) tissue





FRAC Group Code(s)	Products (chemical common names)
11	Quadris (azoxystrobin), Cabrio (pyraclostrobin), Flint (trifloxystrobin)
3	Rally (myclobutanil), Rhyme (flutriafol)
11 + 3	Quadris Top (azoxystrobin + difenoconazole)
7	Fontelis (penthioapyrad)
7 + 11	Priaxor (fluxapyroxad + pyraclostrobin) Luna Sensation (fluopyram + trifloxystrobin)
7 + 3	Aprovia Top (solatenol + difenoconazole)
13	Quintec (quinoxifen)
U8	Vivando (metrafenone)
M	Sulfur (dusting sulfur, wettable/sprayable/micronized sulfurs)
Not categorized	Kaligreen and others (potassium bicarbonate)
	Regalia (plant extract)
	Taegro, Sonata, Actinovate (biological fungicides)

Fungicide Resistance Management

FRAC Group Code	Fungicide Resistance Risk*
Group 11 – e.g. Quadris, Cabrio	High
Group 7 – e.g. Fontelis	Medium to high
Group 3 – e.g. Rally Group 13 – e.g. Quintec	Medium
Mixtures combining medium/high risk groups – e.g. Quadris Top, Priaxor	Risk lower than using solo product
Group M – e.g. sulfur	Low
Not categorized – e.g. oils, biological fungicides, potassium bicarbonate	resistance not known – presume risk is low

**Risk categorization assigned by the Fungicide Resistance Action Committee (FRAC)*

Summary

- New *Oidium* mildew found throughout San Joaquin Co. in 2015
- *Oidium* mildew may cause problems earlier in the season (e.g. July)
- Both mildew pathogens can be present in the same field
- May be more challenging to scout a field for early symptoms?

Chemical control

- Sulfur and other fungicides appear to control *Oidium* mildew in my trials
- Early treatment
- Consider other target pests and diseases when choosing a product
- Good coverage, penetrate canopy
- Resistance management: Utilize good product rotations, tank mixes or formulated mixtures

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