

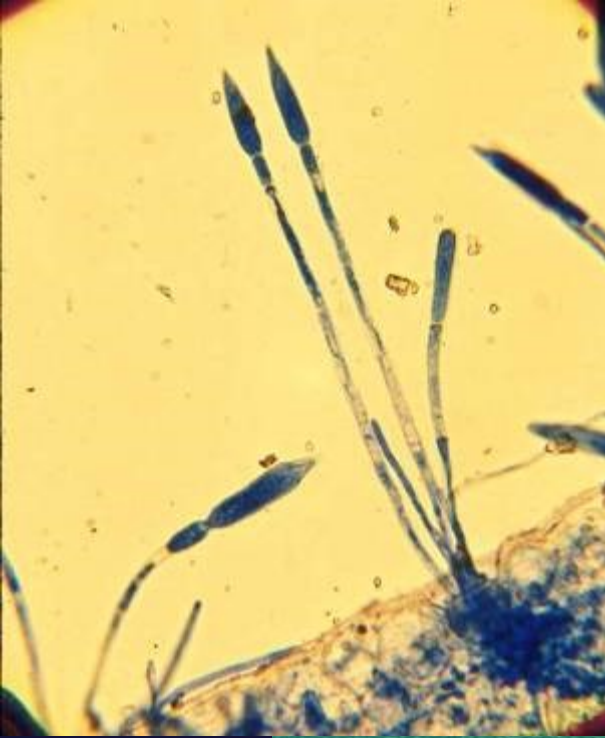
Pepper Diseases: Concerns and Management

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TriCal Diagnostics



Powdery mildew: Oidiopsis





Management: Powdery mildew

- **Resistant cultivars:**
 - Some *Capsium annuum* R lines exist
 - Not suitable for CA production?
- **Disease more severe w/ high humidity.**
- **Overhead sprinkler irrigation reduces severity, but increases other problems.**
- **Monitor adjacent host crops (tomato).**
- **Apply fungicides.**

**Bacterial spot:
Xanthomonas**





Fungicides

- **Sulfur: effective, many regular apps.**
- **Cabrio, Flint, Fontelis, Luna, Quadris, Quintec, Rally**
- **Organic: sulfur, K bicarbonate, oils, K phosphate, plant extracts, neem seed extract, biological control agents (AQ 10)?**

Fungicide trial: Pepper powdery mildew

<u>Treatment</u>	<u>PM severity</u>
Luna Sensation 7.6 fl oz	1.38
*Luna Privilege 6.8 fl oz	1.68
Cabrio 8 oz	1.98
Actinovate 2.4 lb	5.21
Untreated	5.53
LSD ($P = 0.05$)	0.53

1 = no pm; 6 = 76 to 100% leaf surface w/ pm

*Not registered in CA



Control



Luna Sensation

Soilborne diseases of pepper

- **Verticillium wilt**
 - *Verticillium dahliae*
- **Fusarium wilt**
 - *Fusarium oxysporum*
- **Phytophthora root and crown rot**
 - *Phytophthora capsici*
- **White mold**
 - *Sclerotinia sclerotiorum*
- **Southern blight**
 - *Sclerotium rolfsii*

Soilborne disease symptoms

- **Symptoms common to all pathogens:**
 - **Stunting**
 - **Poor growth**
 - **Chlorosis**
 - **Wilting**
 - **Dieback**
 - **Collapse**
 - **Plant death**

Soilborne disease: Quick field assessment

- **See mycelium or sclerotia?**
 - Southern blight or White mold
- **See internal, vascular discoloration?**
 - Verticillium wilt or Fusarium wilt
- **See rotted roots?**
 - Phytophthora root and crown rot

<u>Symptoms</u>	<u>Verticillium</u>	<u>Fusarium</u>	<u>Phytophthora</u>	<u>Sclerotinia</u>	<u>Sclerotium</u>
Small, stunted plants	yes	yes	yes	yes	yes
Wilted leaves	yes	yes	yes	yes	yes
Yellowed leaves	yes	yes	yes	yes	yes
Collapsed plants	yes	yes	yes	yes	yes
Decayed crowns	no	no	yes	yes	yes
Vascular discolor	yes	yes	no	no	no
Rotted roots	no	no	yes	no	no
White mycelium	no	no	no	yes	yes
Sclerotia on crown	no	no	no	yes	yes
				irr., black	round, brn

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Verticillium

Phytophthora



Sclerotium rolfsii



S. rolfsii



Sclerotinia

Management: Soilborne diseases

- **Crop rotation**
- **Avoid planting pepper in infested fields**
- **Fumigation**
- **Resistant varieties?**
- **Sanitation: avoid spreading the pathogen**

Virus pathogens of pepper

- **Difficult to diagnose:**
 - Symptoms overlap
 - Multiple virus infections
- **Main factors for control:**
 - Account for virus reservoir
 - Weeds
 - Nearby host crops
 - Vector management
 - Resistant cultivars (TSWV)

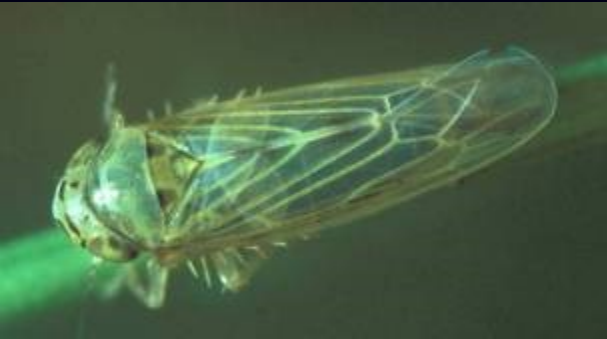
Common pepper viruses and vectors

- Tomato spotted wilt: **thrips**
- Impatiens necrotic spot: **thrips**
- Cucumber mosaic: **aphid**
- Pepper mottle: **aphid**
- Potato virus Y: **aphid**
- Tobacco etch: **aphid**
- Alfalfa mosaic: **aphid**
- Beet curly top: **leafhopper**
- Pepper mild mottle: **seed, mechanical**
- Tobacco/tomato mosaic: **seed, mech.**



Cucumber mosaic virus





**Beet curly top
virus**

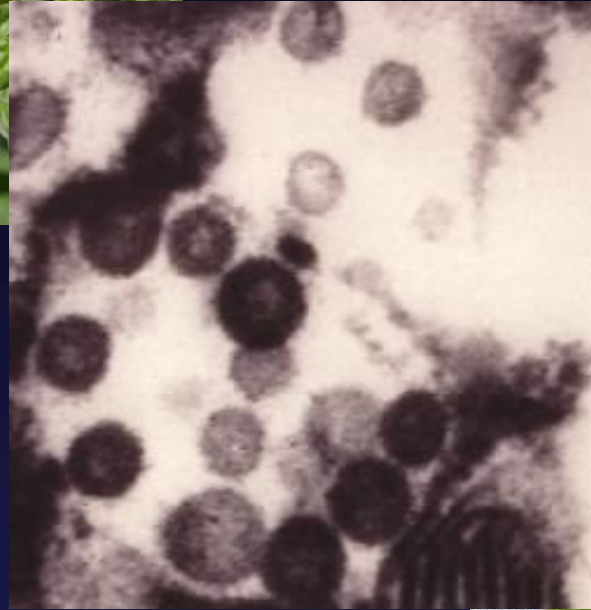


TSWV

**Tomato resistant
to TSWV (Sw-5)**



**Resistance breaking
strain of TSWV**



RB-TSWV

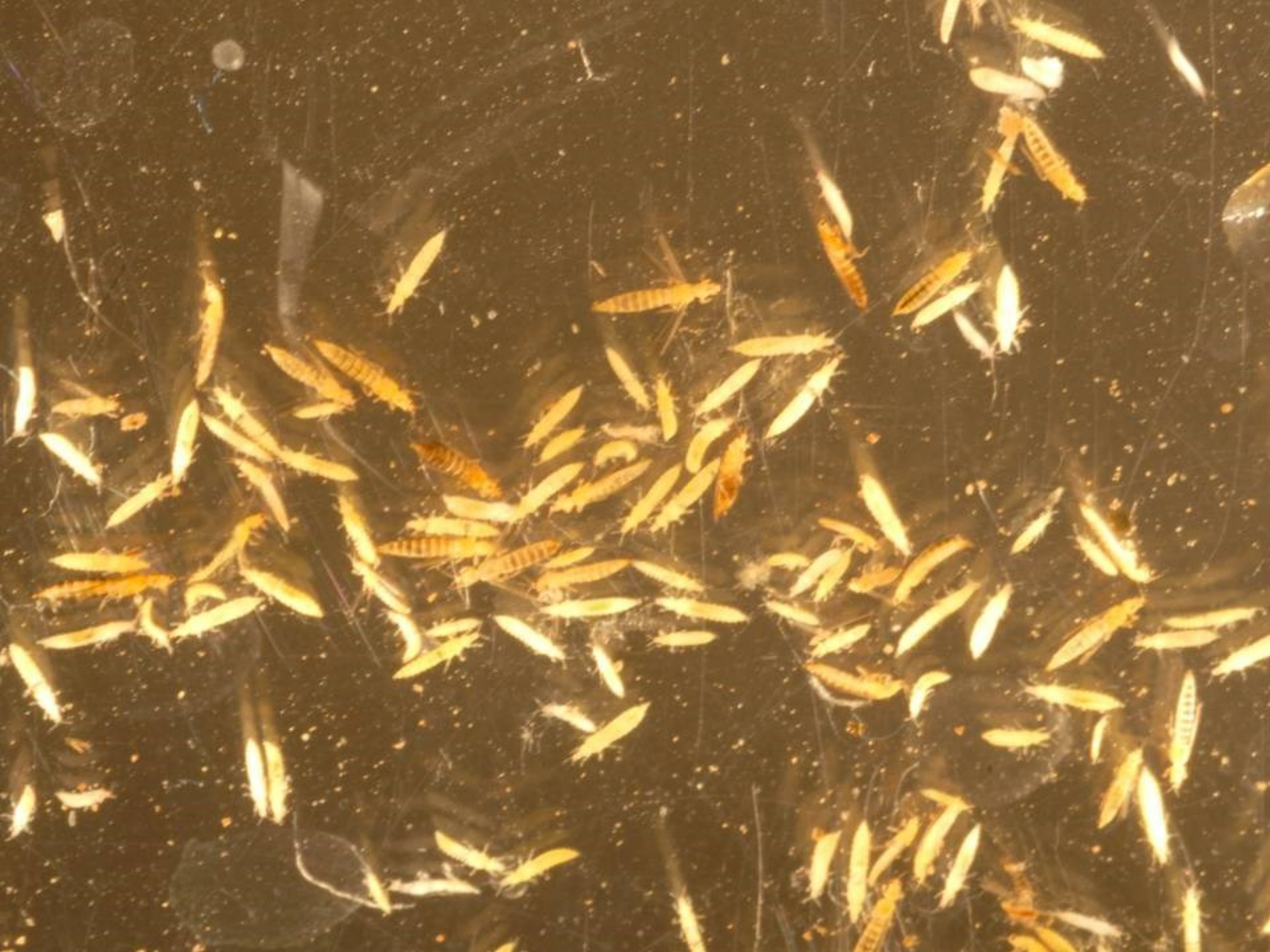
In Central Valley

On tom, cel, lettuce



Diseased tomato





Synthetic insecticides for thrips

- acephate
- abamectin
- chlorpyrifos
- cyhalothrin- λ
- cypermethrin
- diazinon
- dimethoate
- endosulfan
- methiocarb
- methomyl
- methyl parathion
- permethrin
- spinetoram
- spinosad

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* Resistance reported



