Monitoring southern blight prevalence in Colusa County

Photo credit: C. Swett

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Southern blight, *Sclerotium rolfsii*

- Southern blight is a destructive crown rot disease
- Rapidly kills tomato plants
- Over 500 plant hosts
- Persists year to year in crop debris
- Favored by high temperatures (>86° F), high soil moisture, dense canopies, and frequent irrigation

Photo credit: C. Swett

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Background

- Late planting dates and high temperatures in 2017→ favorable conditions for disease development
- Future years, southern blight may continue to be a problem
- 2016-1 tomato field in Colusa County
- 2017-5 fields (4 tomato, 1 bean)
  - Only represents fields with CONFIRMED southern blight

Colusa County bean field (rotation after tomatoes in 2016). June 2017.

Colusa County tomato samples with southern blight, no characteristic symptoms. June 2017.

Southern blight symptoms

- Small, tan to reddish brown sclerotia form at the base of the plant and / or in the soil right around the plant
- White fan-like mycelium growing on the crown and/or into the soil
- Healthy to dead in less than a week
- Disease patches are roughly circular


Photo credit: J. Nunez


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Objectives

1. Monitor southern blight disease development in fields in Colusa County previously planted to tomatoes (in 2017 and 2016), known to have the pathogen.

2. Monitor southern blight spread in Colusa County tomato fields in close proximity to fields monitored in Objective 1.

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Goals

- **Determine if southern blight is growing problem in Colusa County and determine need for improved management**
- **Assess carryover/potential spread by monitoring adjacent fields**
- **Information on capability of certain crops to host southern blight due to variety of rotational crops used**

Photo credit: J. Nunez

Canary bean field 2017 with symptoms.

In-field Procedures

- 5 fields with confirmed southern blight and additional 4 fields tested
- Sampled soil in May 2018 and August/September 2018
- Rotational crops included sunflower (3), corn (5) and cucumber (1)
- Regular site visits to sunflower fields and nearby tomato fields after first heat spell (>90° F) to monitor symptom development

Photo credit: J. Nunez

Field site with cucumber rotation, September 2018.

Lab Procedures

- Soil dried and sieved through 2 mm mesh
- 100 g of soil placed on paper towel lined tray and 125 ml methanol (1%) was added
- Sealed in a large plastic bag to stimulate germination with moisture
- Sclerotia germination evaluated 3 and 7 days later

Photo credits: C. Swett

Results

- At time 0 (May 2018), sclerotia recovered from 3 fields, possibly 5 fields
  - With fields 6 and 7, ID was unclear
- At time end-of-season (August/September 2018), sclerotia recovered from 7 fields
  - 5 fields had increased sclerotia levels from May-September
  - 2 fields had decreased levels
  - 1 field had the same number as baseline soil samples
- Southern blight increased in all 3 sunflower fields between May and September
- Corn fields were spread between increases, decreases, and no changes between samples
- Fields where no sclerotia were recovered may contain southern blight, but it was not captured among our samples
- Do not have the end-of-season data for the cucumber field

Field	Time 0	Time end-of-season	Time 0	Time end-of-season	Crop		Notes
	Average sclerotia levels/100 g soil		Total # sclerotia/total amount of soil		2017	2018	
1	0.17	0.29	3/500g	3/1050g	tomato	corn	
2	0.00	1.57	0/1100g	**22/1400g**	tomato	corn	
3	0.00	N/A	0/600g	N/A	tomato	cucumber	
4	0.67	0.29	7/300g	4/1400g	tomato	corn	
5	0.00	0.95	0/400g	**10/1050g**	wheat	corn	
6	0.19	0.00	2/300g	0/1400g	tomato	corn	Southern blight ID uncertain at Time 0
7	0.10	0.50	0/600g	**7/1400g**	tomato	sunflower	Southern blight ID uncertain at Time 0
8	0.11	0.86	2/600g	**15/1750g**	tomato	sunflower	
9	0.00	0.86	2/500g	**21/2450g**	canary bean	sunflower	

Conclusions

- 2017 conditions were ideal for disease development, but not in 2018
  - 2018 was cooler compared to 2017→ did not expect much southern blight to develop
  - 1 farm call that resulted in a southern blight diagnosis
- Sunflower is not an effective rotational crop for managing southern blight
- Corn may not be the best choice either, but appears to be better than sunflower
- These 9 fields may be critical for future trials to improve management methods, especially if future growing seasons resemble 2017
- Southern blight has potential to cause losses for specific fields in the Sacramento Valley in future years and spread to other fields

References

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- Woodward, J. E., Brenneman, T. B., and Mullinix, B. G., Jr. 2012. Irrigation timing impacts the efficacy of foliar-applied fungicides toward foliar and soilborne pathogens of peanut. Plant Dis. 96:1785-1790.

2018 Season Review

Disease	# fields
Fusarium wilt	17
Fusarium crown and root rot	2
Verticillium wilt	1
Alfalfa mosaic virus	1
Southern blight	1
Bacterial canker	1

Questions?