

Fusarium wilt of strawberry is a disease of major concern, caused by the fungus *Fusarium oxysporum* f. sp. *fragariae* (*F.o. fragariae*). Symptoms include stunting, wilting, crown discoloration, and collapse of the plant.

Below: vascular discoloration caused by *F.o. fragariae*



This disease is typically managed by:

- Fumigation
- *F.o. fragariae* resistant cultivars
- Anaerobic soil disinfestation (ASD)
- Crop rotation

None of these strategies are a one-size-fits-all approach to controlling this disease. Best results are achieved by combining multiple, complementary practices.

Our research shows that 1-year rotations with weak hosts can lead to net reductions in the amount of soilborne *F.o. fragariae*. However, rotations with reservoir hosts, such as raspberry, may increase the amount of *F.o. fragariae* in soil.

Future Research:

Soil amendments and *F.o. fragariae*:

Common ASD ingredients (such as rice bran/hulls and mustard seed meal) can lead to increases in the amount of *F.o. fragariae* if anaerobic conditions are not achieved. Future research will assess whether other common soil amendments, such as compost, also affect populations of this pathogen.

Crop termination:

Our research shows that *F.o. fragariae* builds to high populations on the tissues of strawberry plants. Ongoing research is assessing whether applying fumigants just prior to tillage can kill *F.o. fragariae* inside strawberry tissues, and thereby reduce the amount of the pathogen that is returned to the soil.

Acknowledgements:

Sarah Frieberg (illustrations)

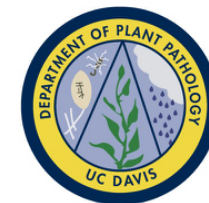
Research sponsors:



The Life Cycle of *Fusarium oxysporum* f. sp. *fragariae*: Implications for disease management practices



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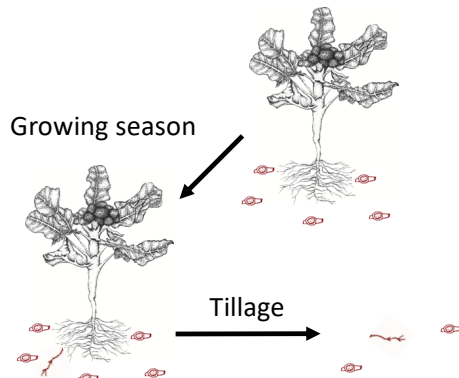


End of season management:

- Crop rotation with weak hosts
- Remove symptomatic plants
- Crop termination?

Weak hosts:

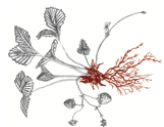
1-year rotations with weak hosts lead to a **net reduction** in the *F.o. fragariae* population. 3-year rotations may lead to substantial reductions in disease severity.



Crop debris removal:

Removing infested plants will reduce the amount of *F.o. fragariae* returned to the soil during tillage.

Removed plants:

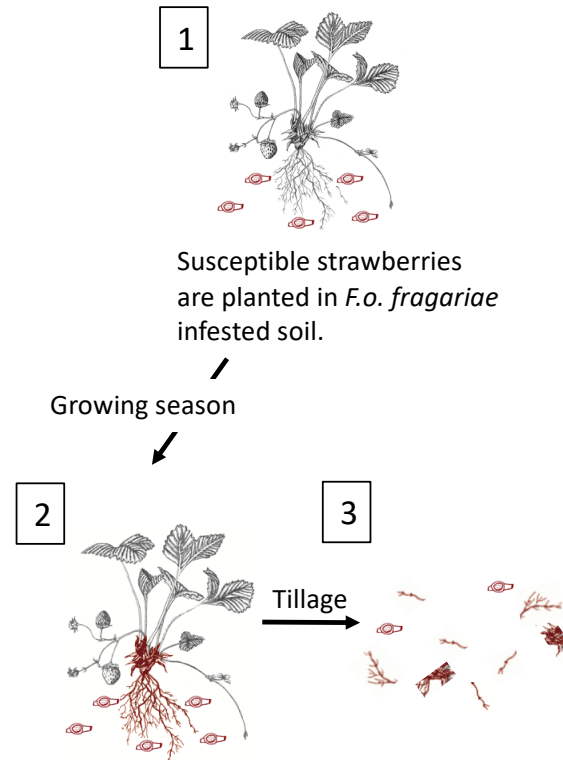


vs.

Remaining population:



The *F.o. fragariae* life cycle:



F.o. fragariae grows to high populations on plant tissues.

The soilborne *F.o. fragariae* population is now larger.

Notes on life cycle: Evidence suggests that dormant spores of *F.o. fragariae* do not persist in soil with an active microbiota for long periods of time. Instead, growth on plant debris and some amendments maintains pathogen populations between seasons.

Pre-planting management:

- Resistant cultivars
- ASD
- Fumigation
- etc.

Reservoir hosts:

F.o. fragariae resistant strawberry cultivars and raspberries do not show symptoms of Fusarium wilt when planted in infested fields. However, they can still be colonized by *F.o. fragariae*, and the pathogen may maintain or increase populations by growing on their tissues. Resistant strawberry cultivars may also yield less in *F.o. fragariae* infested fields. It is recommended that additional disease management strategies are used when planting reservoir hosts to avoid these risks.

Crop:	Host type:
Spinach	Weak
Broccoli	Weak
Cilantro	Weak
Lettuce	Weak
Wheat	Weak
Raspberry	Reservoir
<i>F.o. fragariae</i> -resistant strawberry cultivars	Reservoir
<i>F.o. fragariae</i> -susceptible strawberry cultivars	Symptomatic