

## Disease Diagnosis, Symptomology, and Etiology

### Results of symptomatic orchard sampling from 2015—2018

**Botryosphaeriaceae cankers**

- Identified in 43 orchards
- 12 fungal species
- Neofusicoccum* species most virulent
- Band canker and pruning wound cankers
- Young trees (2<sup>nd</sup> to 5<sup>th</sup> leaf)

**Ceratocystis canker**

- Identified in 25 orchards
- Ceratocystis destructans*
- Infections associated with mechanical harvester damage
- Fungus spread by insects

**Cytospora canker**

- Identified in 13 orchards
- Five *Cytospora* species associated with cankers
- Pruning wound infections
- Other hosts: cherry, prune

**Eutypa canker**

- Identified in 8 orchards
- Eutypa lata*
- Pruning wound infections
- Can infect cracks in tree crotch due to poor scaffold selection

**Collophorina and Pallidophorina cankers**

- Identified in 7 orchards
- Collophorina hispanica* and *Pallidophorina paarla*
- Pruning wound infections on smaller branches
- Emerging canker disease of almond

**Phytophthora canker**

- Infrequently observed
- Tree crotch or trunk infections
- Fatal on young trees

## Integrated Management of Almond Trunk and Scaffold Canker Diseases

### Pruning wound protection and susceptibility field trials, 2016—2019

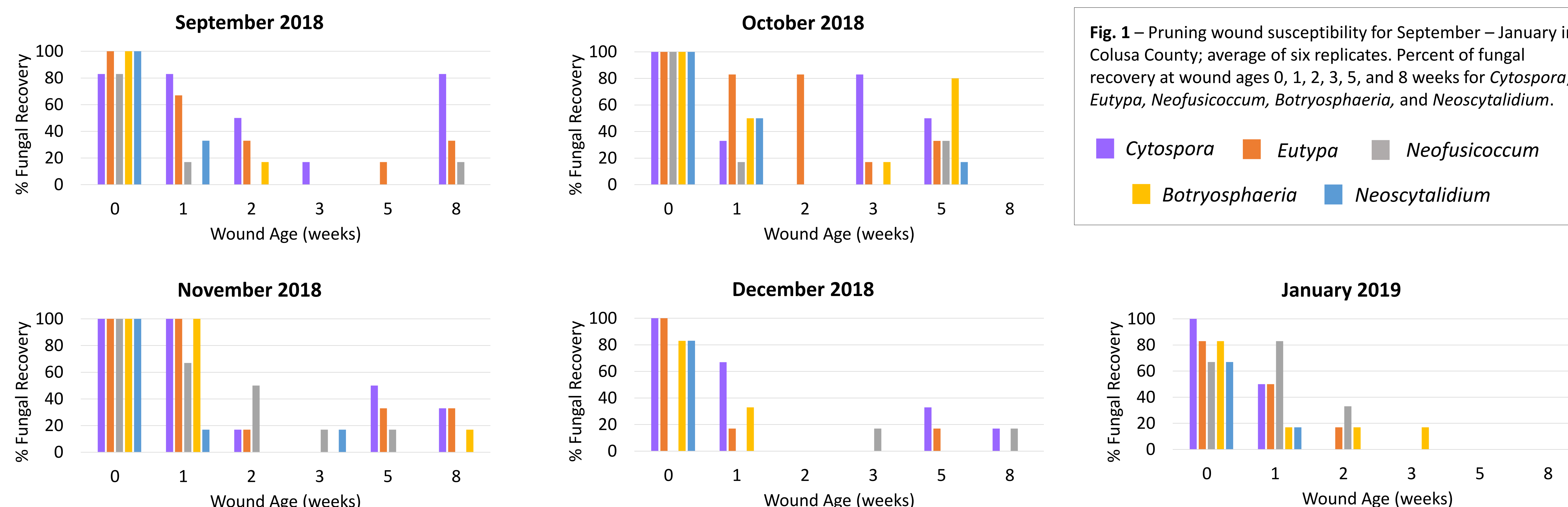
- Pruning wounds are the main infection sites for fungal canker pathogens.
- To reduce the impact of canker diseases and prevent infections, pruning wounds can be protected during susceptible periods.

#### When is the best time to prune?

- January showed the lowest infection rates
- When pruning wounds are not exposed to inoculum (in the absence of rain) there is limited risks of infection

#### How long are pruning wounds susceptible to infection?

- Fresh wounds regardless of pruning month are the most susceptible to fungal infection
- After 2 weeks pruning wound susceptibility decreased by 60% and after three weeks it decreased by 75%



#### What products can protect pruning wounds from infection?

- Topsin M** (thiophanate-methyl) reduced overall infection rates by 82%
- A biocontrol product (formulated with the fungus *Trichoderma atroviride*) reduced overall infection rates by 77%
  - This product is currently in the registration process as a pruning wound protectant for almond canker diseases in California
- Acrylic paint performed inconsistently over the trial years and only reduced overall infection rates by 45%

