

# BACTERIAL DISEASES ON STONE FRUIT: LEARNING LESSONS FROM 2013



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# Overview

## Bacterial spot



- Predisposing factors
- Symptoms
- Disease Cycle
- Management

## Bacterial canker



# Bacterial Spot

- Most Important Bacterial Disease of Peach and Nectarine
- *Xanthomonas arboricola* pv. *pruni* (Xap)
- Japanese plum, almond, apricot, pluot, & aprium
- Yield Limiting Symptoms
  - Resistant varieties
- 100% Fruit Loss Observed
- Few Effective Controls



# Bacterial Spot

- Predisposing factors favoring the occurrence of bacterial spot
  - Cultivar susceptibility
    - Early bud break and early fruit ripening
  - Sandy and very clay soils
  - ~ 86 °F temperature
  - Relative humidity of 100% over a period of 3 days = appearance of disease





# Bacterial Spot Symptoms - Fruit

- **Early Season Lesions**

- 3 weeks after petal fall
- Irregularly shaped
- Extend deep into fruit

- **Late Season Lesions**

- Shallow
- Skin Cracking
- Secondary infection: brown rot



Early season



After pit-hardening

# Bacterial Spot Symptoms - Fruit

- **Peach Scab**
  - Circular lesions
  - Dark olive-brown, fuzzy lesions
- Lesions form pattern
- No fruit surface pitting
- No foliar symptoms





# Bacterial Spot Symptoms - Leaves

- Most susceptible before full expansion
- Angular lesions
- “Shot-hole” appearance
- Yellowing
- Premature defoliation
- Copper & Captan injury



# Bacterial Spot Symptoms - Twigs

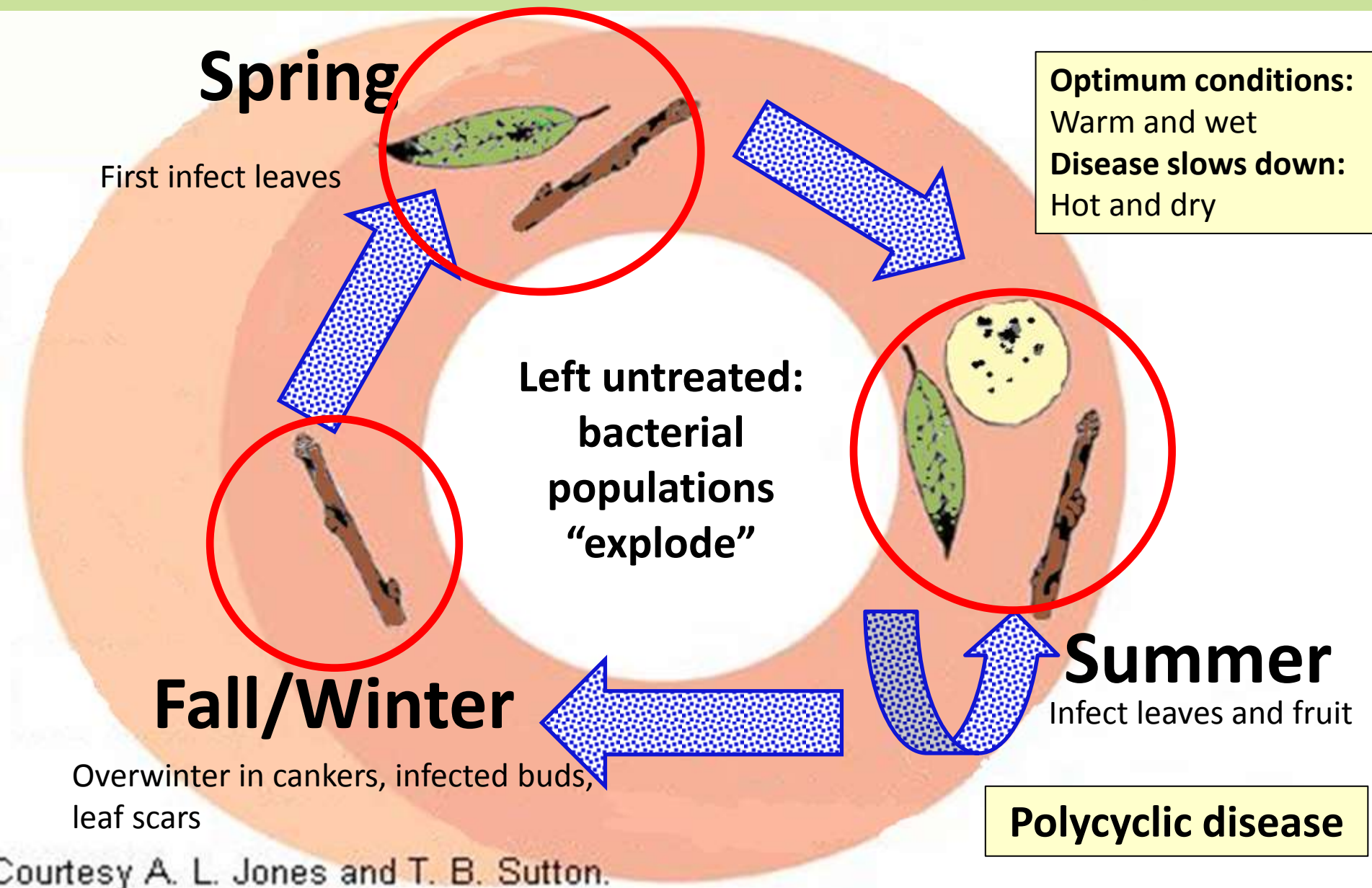
- Cankers
- Lack of vegetative growth
- Bark cracking
- Overwintering site for bacteria
- Black Tip



Ritchie, D.



# Bacterial Spot Disease Cycle



# Bacterial Spot Management

- **Two Main Strategies**
  - **Resistant Cultivars**
    - Not immune = Still needs control measures
  - **Chemical Products**
- **Copper**
  - **Phytotoxic**
  - **Risk of resistance**
- **Oxytetracycline**
  - **Suppresses bacteria**
  - **Up to 10 applications per season**
  - **Risk of antibiotic resistance**
  - **Persistent yield loss**
  - **Label limitations**

# Bacterial Canker

- Limits tree life and productivity
- Cold weather disease
- Caused by several *Pseudomonas* bacterium:

*Pseudomonas syringae* pv. *syringae*

*Pseudomonas syringae* pv.  
*morsprunorum*

- Losses due to fruit lesions are sporadic
  - Moves into the trunk = limits production and tree decline



Bacterial canker on cherry branch



# Bacterial Canker

- Predisposing factors favoring the occurrence of bacterial canker

## ➤ Training systems

Ranked in order of increasing vulnerability to canker infections

Least susceptible

Perpendicular V

Vertical Axis

Marchant

Vogel Slender

Spindle

Modified Central Leader

Most susceptible


Spanish Bush

# Bacterial Canker

- Predisposing factors favoring the occurrence of bacterial canker

- Cultivar susceptibility

Ranked in order of increasing severity of bacterial incidence

 Sweetheart, Lapins, Tehranivee, Hedelfingen, Regina

- Rootstock susceptibility  
Gisela rootstocks highly susceptible

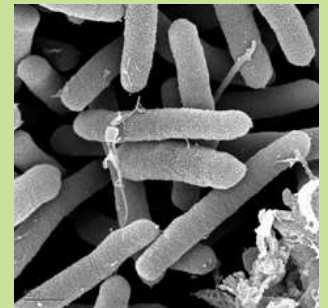
# Bacterial Canker

- **Predisposing factors favoring the occurrence of bacterial canker**
  - **Sandy and clay soils**
    - **Nutrient deficiency**
    - **High ring nematode populations**
  - **Winter pruning**
  - **Spring freezes**



# Bacterial Canker

- **Predisposing factors favoring the occurrence of bacterial canker**
  - **Cold weather disease (\*May 2013 freeze)**
    - **Ice nucleation & frost injury**
    - **Proteins allow water to freeze at higher temperatures resulting injury to the plant**
    - **Bacteria “feed” on the nutrients released by the injured plant tissue**



# Bacterial Canker Symptoms

## Fruit

- Sporadic
- Water – soaked lesions
- Chocolate – brown lesions



# Bacterial Canker Symptoms

## Leaves

- Sporadic
- Necrotic lesions
- Chlorotic rings
- “Shot hole” appearance
- Lesions occur along leaf margin – curling effect





# Bacterial Canker Symptoms

## Branches and Trunk

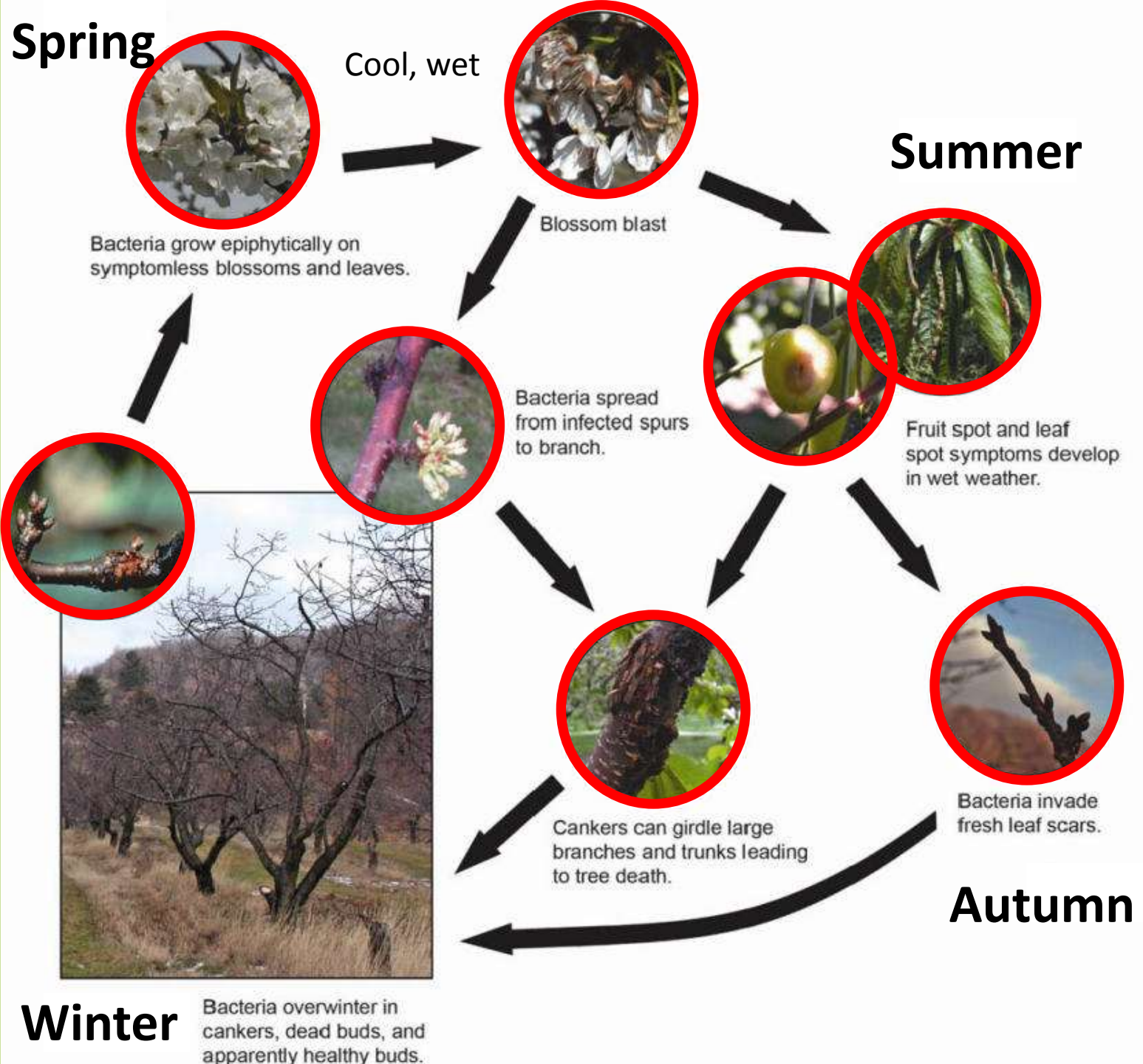
- Facilitated by stress
  - Spring frost
  - Severe winter freezes
  - Water – soaking
  - Blossom infection
  - Pruning wounds
  - Insect injuries
- Sunken bark
- Amber gummosis
- Girdled branches and trunks
- Limb and tree death
- Cytospora Canker



# Bacterial Canker Disease Cycle

**\*\*humid conditions = very hard to control**

**\*\*wind and rainstorms move the bacteria**



# Bacterial Canker

## Favorable conditions - susceptibility

- **Mid-April:**
  - *P. syringae* populations increase 10 – to 100 – fold during bloom
- **Summer:**
  - *P. syringae* populations low
- **Autumn rains and cooler temperatures:**
  - *P. syringae* detected at high levels prior to and during leaf fall
    - \*\*\* Infection at leaf scars can be high
- **Early to mid-winter**
  - Exposed to severe temperatures increases chance of infection

# Bacterial Canker Management

- Goal: reduce number of bacteria before trees enter susceptible period
- Using Copper\*
  - Bordeaux mixture PLUS vegetable oil
    - 2.8 qts/100 gal vegetable oil
      - (described: <http://jerseyfruitagupdates.blogspot.com/2012/09/spray-cherries-for-bacterial-canker.html>)
  - Sept, Oct, Nov, and in spring
- Pruning\*
  - Avoid large dormant cuts
  - Minimize impact of disease with summer pruning
  - 12 inch rule: distances infection from the main trunk





# Bacterial Canker Management

- **Remove/Prevent tree stressors**
  - Plant in well drained soils
  - Weed control: weeds support populations of bacteria
  - Remove wild *Prunus*
  - Maintain adequate nutrients
  - Do not interplant new trees with old trees
    - Old trees source of bacteria



# Bacterial Canker Summary

- Favored by cool, wet weather or frost events
- Limb and trunk – girdling cankers
- Mindful pruning
- Using copper + vegetable oil in the fall



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## QUESTIONS?



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