

Bacterial Canker Management of Stonefruit Trees

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Bacterial "blast"



Bacterial canker

- Extensive dieback of limbs
- Tree death



**“Gummosis” or
bleeding through the
bark**



**Necrotic islands of
bacterial colonization**

**Fermented or “syrup”
smell**



Necrotic spots
coalesce into larger
canker

Cankers extend
across bud union

Do not extend
below ground

- Different than
Phytophthora



Because roots remain alive, suckers develop at base of tree

Bacterial Canker: a devastating disease of *Prunus spp.*

- *Pseudomonas syringae* pv. *syringae* (Pss)
- *P.s.* is always present on plant surfaces
- May enter through lenticels?
- Bacteria is stimulated to produce syringomycin which is toxic to tree tissue



Conditions Associated with Bacterial Canker

- Replanted almond and stonefruit orchards
- Sandy soil
- Young trees
- Ring nematode (*Mesocriconema xenoplax*)
- Plant nutrition (N, Ca, micronutrients?)
- Temperature (freezing/thawing)
- Soil conditions (texture, moisture, and pH)

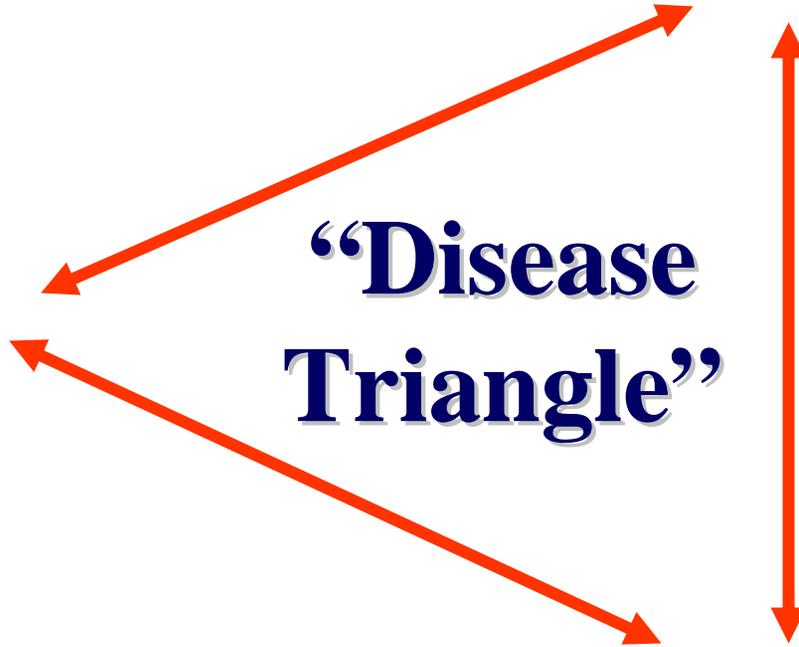


Pathogen present
(Pseudomonas syringae)

**Conducive
Weather**

**“Disease
Triangle”**

Susceptible Host
(stonefruit tree)



Bacterial canker management should focus on making trees less susceptible, not eliminating or killing the pathogen.

Strategies for Reducing Bacterial Canker

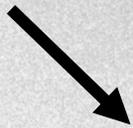
- Begin with good field preparation
 - Use Virgin Soil!
 - Fix Physical Soil Problems
 - Deep ripping, backhoe, etc.
 - Fix Chemical Soil Problems
 - Increase organic matter
 - Cover crop, etc.
 - Correct soil pH (sulfur or lime)

Strategies for Reducing Bacterial Canker

Field Preparation Continued...

- Fix Biological Soil Problems (nematodes and pathogenic organisms)
 - Fumigation: MB, Telone, chloropicrin(?)
 - Annual nematode maintenance with nematicides (Enzone, Nemacur)
 - Microbiological soil amendments don't work

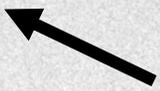
Dagger



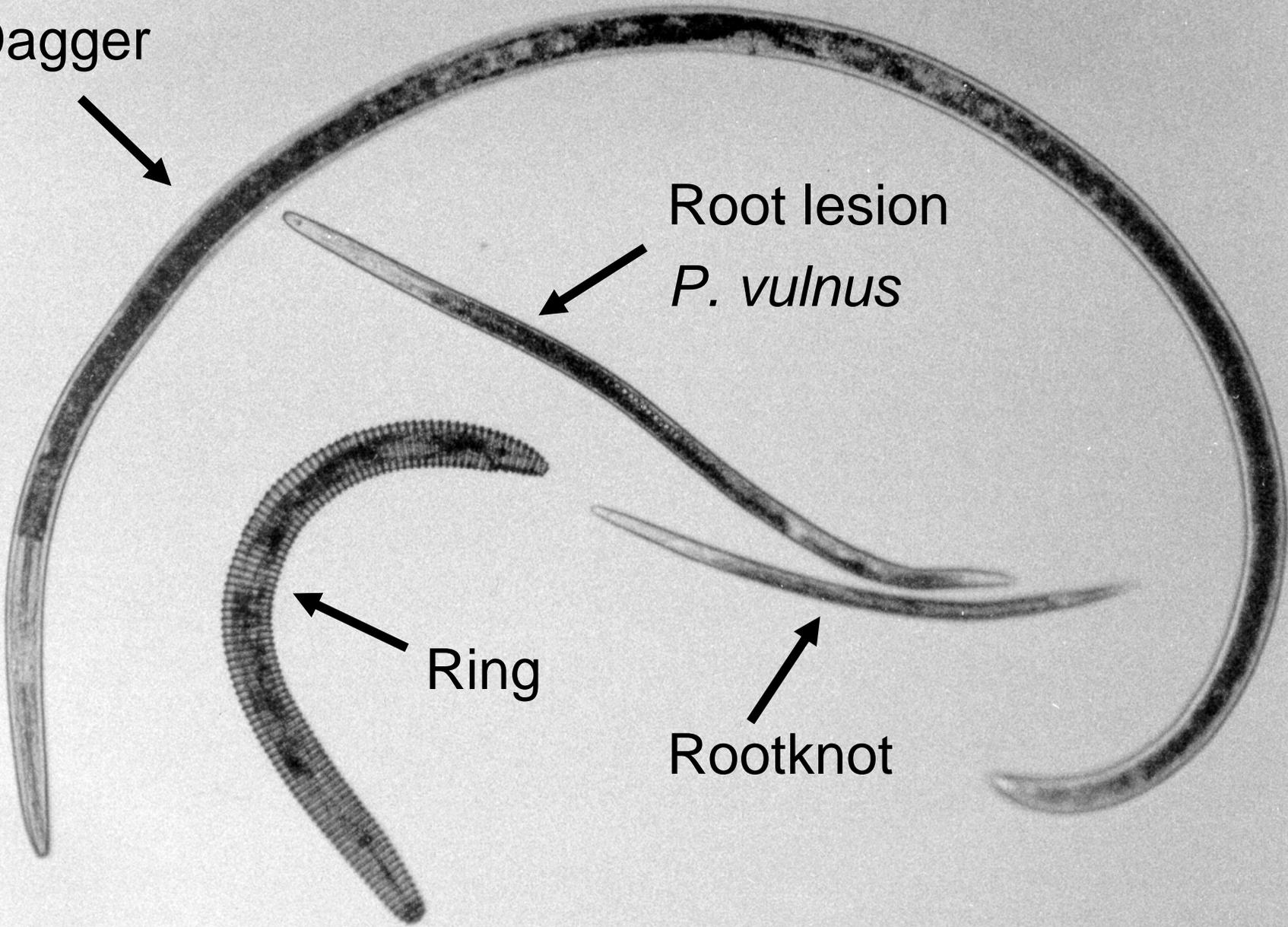
Root lesion
P. vulnus



Ring



Rootknot



Effects of ring nematodes on host physiology & susceptibility

- Increase water stress
- Induce nutrient deficiency (N, P, K)
- Elevate levels of certain phenolic compounds in peach stems
- Increase tree susceptibility to bacterial canker

Strategies for Reducing Bacterial Canker

Cultural Operations

- Rootstock
 - Very important management tool
 - No rootstock known resistant to ring nematode
 - Peaches and almonds use Lovell or Viking
 - Mahaleb best cherry rootstock for bc?
 - Many new (foreign) rootstocks being tested

Strategies for Reducing Bacterial Canker

Cultural Operations Continued...

- Drip or microsprinkler irrigation
- Late pruning (March)
 - Apricot trial:
 - Nov / Dec. pruned trees: 22% mortality from bc
 - March pruned: 7% mortality

Strategies for Reducing Bacterial Canker

Cultural Operations Continued...

- Foliar Copper Sprays
 - Monthly sprays from leaf fall through popcorn reported to help in some countries
 - Not much success here
 - Maybe leaf fall + dormant?

Strategies for Reducing Bacterial Canker

Cultural Operations Continued...

■ Nutrition

- Calcium - foliar and / or soil applied
- Micronutrients - foliar sprays
- Nitrogen
 - multiple small applications through season
 - fall foliar urea

Post-harvest Sprays with Foliar Urea

- Efficient way to fertilize with N during a period of low root uptake
- Absorbed into leaf within 24-48 hours
- Transported out of leaf and into storage tissues with 5-7 days

Post-harvest Sprays with Foliar Urea

- Application of 100 lbs of low biuret urea gives about 50 lb of N (about half of annual requirement for peaches)
- Easily dissolves in 100 gallons of water
- Ureas
 - Low biuret urea ~ 0.25% biuret
 - Ultra low biuret urea ~ 0.10% biuret
 - Standard grade urea - variable

Post-harvest Sprays with Foliar Urea

- Application timing: around Halloween
 - Peaches: expect small amount of marginal leaf burn, very little earlier defoliation
 - Almonds: 100 lb too much - death of small shoots and buds low in tree, maybe 50 lb
 - Cherries? 100 pounds reported to be OK??

Effect of Foliar Urea and CaCl Sprays on *P. syringae* Lesion Size

Fertilizer Treatment	MB Fumigation?	Lesion length (mm)
Standard	No	301 a
CaCl	No	78 b
Urea	No	27 c
Standard	Yes	26 c
CaCl	Yes	23 c
Urea	Yes	20 c

Bottom Line...

- There is no magic bullet
- Requires a multiple strategy approach focusing on keeping trees tolerant.
- Includes soil prep & fumigation, rootstock, nematicides, proper irrigation & fertilization (N and micronutrients), early pruning.