

***Bacterial Canker Susceptibility of
Peach:Almond Hybrid
Rootstocks for
California Stonefruit Orchards***

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

- *Pseudomonas syringae* pv. *syringae* (Pss)
- Pathogen may enter through lenticels?
- Islands of necrotic tissue coalesce into large cankers





Gummosis



**Death of small limbs,
scaffolds or entire trees**

History of Bacterial Canker

- **First work done in Europe about 1850 (Barss, 1913)**
- **Serious outbreaks in Oregon as early as 1853.**
- **First formal description in 1891 by Sorauer**
- **First evidence as a bacterium infection in 1902 by Van Hall of University of Amsterdam**
- **First gummosis of cherry in US by Griffin in 1911**
- **Gummosis of apricot first reported by Barrett in 1918 in California**

Conditions Associated with Bacterial Canker

- Young trees
- Replanted almond and stonefruit orchards
- Sandy soil
- Ring nematode (*Mesocriconema xenoplax*)
- “Stress”

**The onset of bacterial
canker symptoms occurs
when external biotic and
abiotic factors predispose a
tree to the disease.**

Predisposing factors

- Ring nematode infestation
- Plant nutrition (N, Ca)
- Temperature (freezing/thawing)
- Soil conditions (texture, moisture, and pH)
- Cultural practices (fall or dormant pruning, irrigation, **rootstock**)

New Rootstocks for California

- ~95% of all almonds and peaches in California are grown on Nemaguard or Lovell rootstocks.
- Emerging interest in new rootstocks.
- Peach / almond hybrids becoming popular due to high vigor, earlier & larger yields.
- Peach / almond hybrids include Hansen 536, Bright's Hybrid, Nickels, Alpha, Titan...

Q: Will peach / almond hybrid rootstocks perform better than standard rootstocks in bacterial canker sites??

Two rootstock trials were initiated in bacterial canker sites

- Commercial Peach Orchard
- Commercial Almond Orchard
- Monitor tree growth, yield, tree nutrition, nematode populations, bacterial canker incidence and severity.

Rootstock Trial #1

Established Feb., 1999

- Third generation peach orchard
- Site with a history of severe bacterial canker
- Soil treated with a solid, tarped methyl bromide fumigation @ 400 lb per acre
- Drip irrigated
- Treated with sodium tetrathiocarbonate (Enzone[®]) annually

Trial #1: Peach Rootstock Trial

Rootstocks include:

- Nemaguard (peach)
- Lovell (peach)
- Deep Purple (plum)
- Hansen 536 (peach / almond hybrid)
- Alpha (peach / almond hybrid)
- Viking (peach / almond / plum / apricot hybrid)

Eight, four-tree replicates

Superior Fruit Ranch Rootstock Trial

est. February, 1999

Variety = 'Riegel'

Sandy soil

History of severe bacterial canker

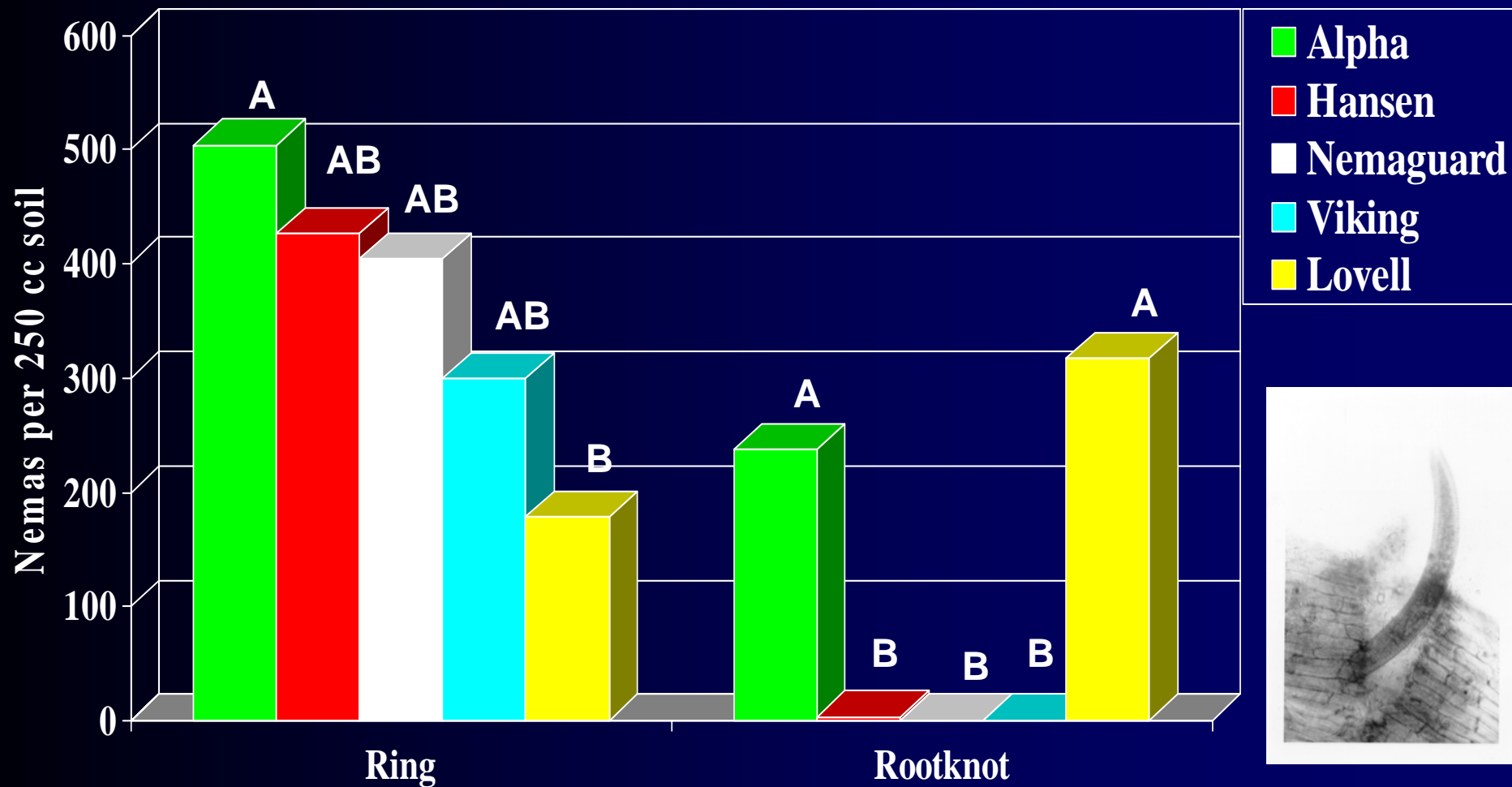


Aerial Photo of Riegel Roostock Trial 2002



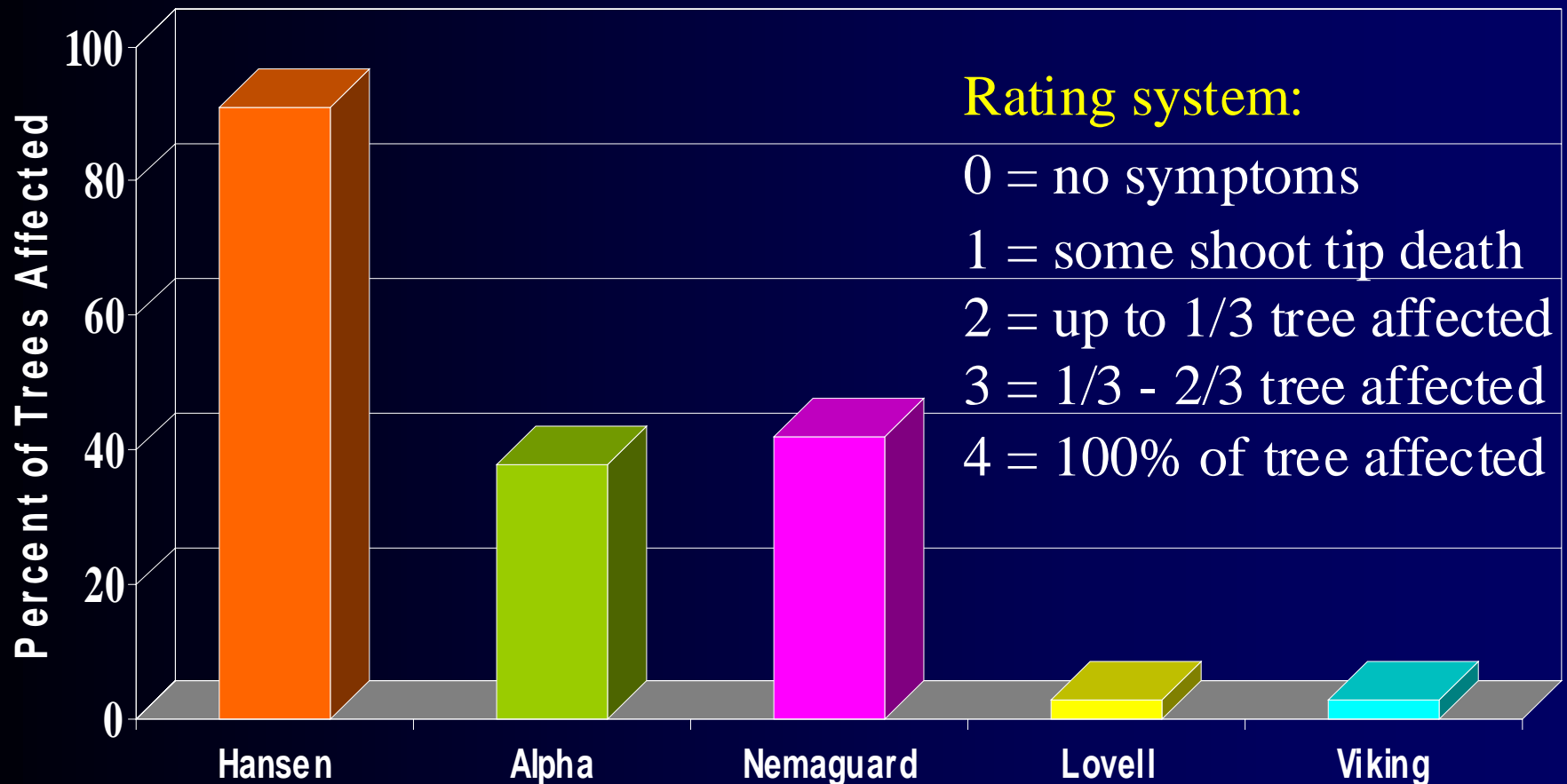
Ring & Rootknot Nematodes Extracted from Rootstock Rhizosphere

Reigel Peach Rootstock Trial, April 2003



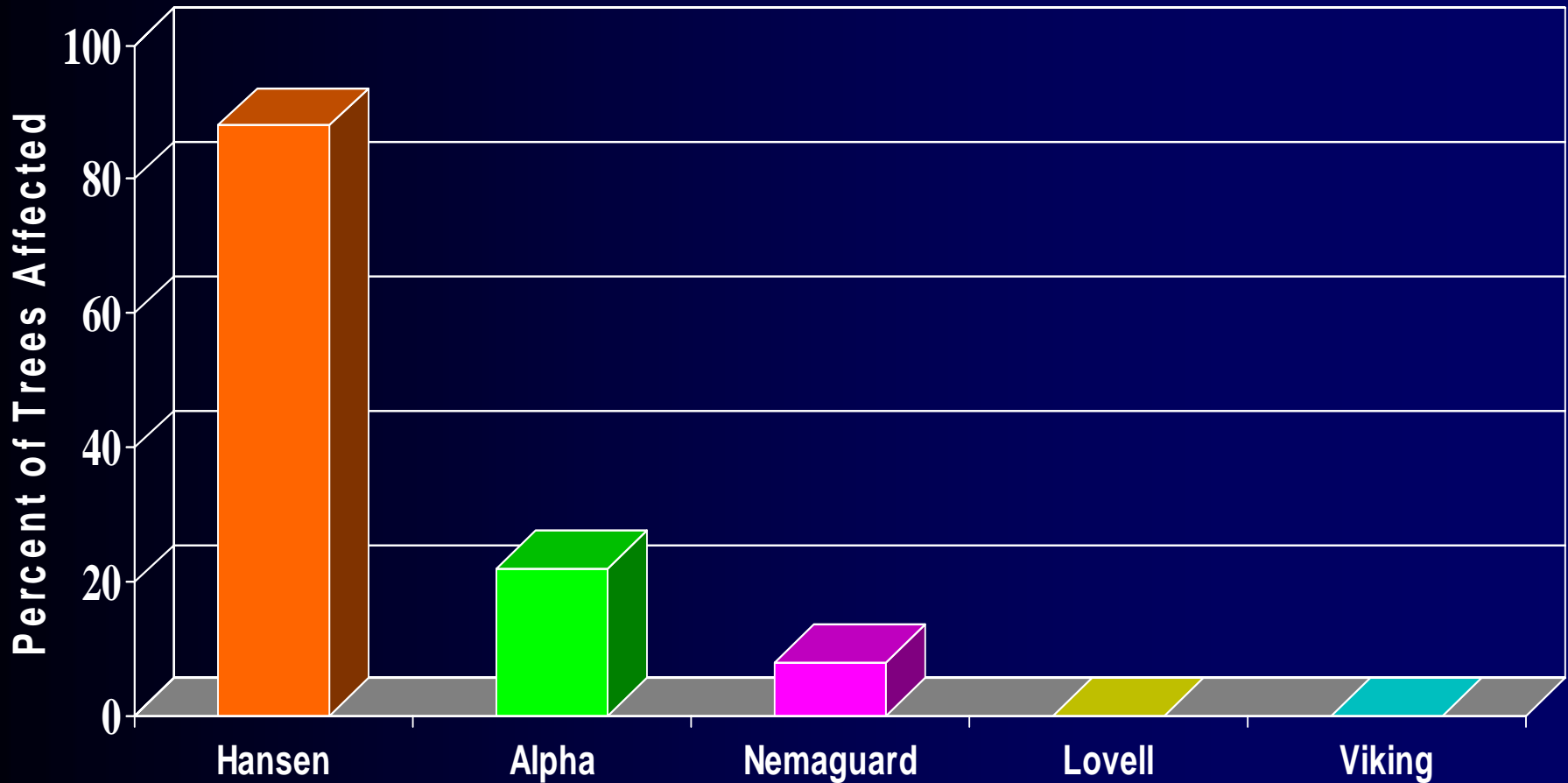
A Comparison of Peach Rootstocks with Bacterial Canker **Rating Severity > 1**

Reigel Cling Peach Rootstock Trial. April, 2003 (5th leaf)



A Comparison of Peach Rootstocks **Killed** by Bacterial Canker

Reigel Cling Peach Rootstock Trial. April, 2003 (5th leaf)





Trial #2: Almond Rootstock Trial

Est. 1998

- Lovell (peach)
- Nemaguard (peach)
- Guardian (peach)
- Hansen 536 (peach-almond)
- Bright's hybrid (peach-almond)
- Nickels (peach-almond)
- Viking (peach-almond-plum-apricot)
- Alpha (peach-almond-plum-apricot)

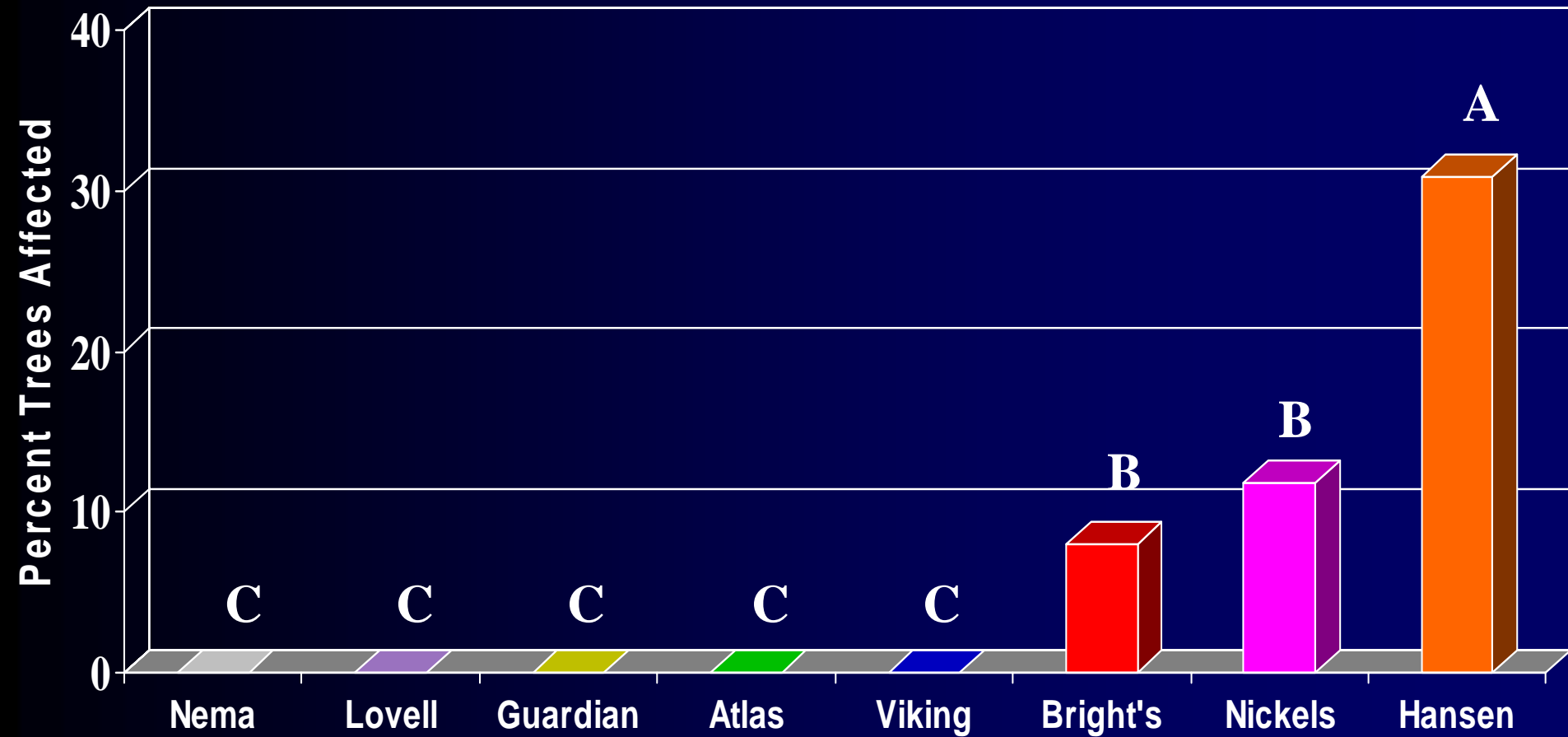
Rootstock Trial #2: Almond

Established March, 1998

- 'Nonpareil' almond
- Third generation orchard
- Area with a history of severe bacterial canker
- Soil treated with a solid, tarped methyl bromide fumigation @ 400 lb per acre
- Flood irrigated
- Ten, 5-tree replications of each rootstock

A Comparison of Almond Rootstocks for Incidence of Bacterial Canker

April, 2002 (5th leaf)



Rootstock Trial Conclusions

- Peach / Almond hybrid rootstocks should not be planted in sites prone to bacterial canker.
- Hansen 536 P/A appears to be particularly susceptible to bacterial canker
- More research is needed to find a bacterial canker “resistant” rootstock