University of California
Agriculture and Natural Resources

Cooperative Extension

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Botryosphaeria Wood Cankers in Almond

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February 1st, 2012

NSJV Almond Day

Scaffold Issues within Orchards

Scaffold Pathogens:

- **Known:**
  - **Ceratocystis Canker**
  - **Band Canker**
  - **Aerial Phytophthora**
- **"Newly Discovered:"**
  - **Pruning Wound Associated Cankers**
  - **Tree Crack Infesting Cankers**
    - ***Botryosphaeria* sp. and/or *Eutypa* sp.**

Scaffold Issues within Orchards

- **Found frequently over the past three years**
  - **Cankers associated with pruning wounds or poor scaffold selection**
  - **Associated with riparian areas**
  - **Isolations indicate wood pathogens that include *Botryosphaeria* and *Eutypa***
  - **Common in Padre, Fritz, have observed in Nonpareil, Avalon, Aldridge**
  - **Not noticeable at first, but scaffold breakage affects orchard life**
  - **Independent of tree age**
  - **Tends to grow throughout the summer**

Pruning Wound Cankers: Trunk

Perennial Scaffold Cankers, *Botryosphaeria/Eutypa spp.*:

Pruning Wound Cankers: Scaffolds

Perennial Scaffold Cankers, *Botryosphaeria/Eutypa spp.*:

Large pruning cuts provide entrance of fungi

Wind Cracks and Inclusions

Perennial Scaffold Cankers, *Botryosphaeria/Eutypa spp.*:

Tree Splits from Fungal Infection

Perennial Scaffold Cankers, *Botryosphaeria/Eutypa spp.*:

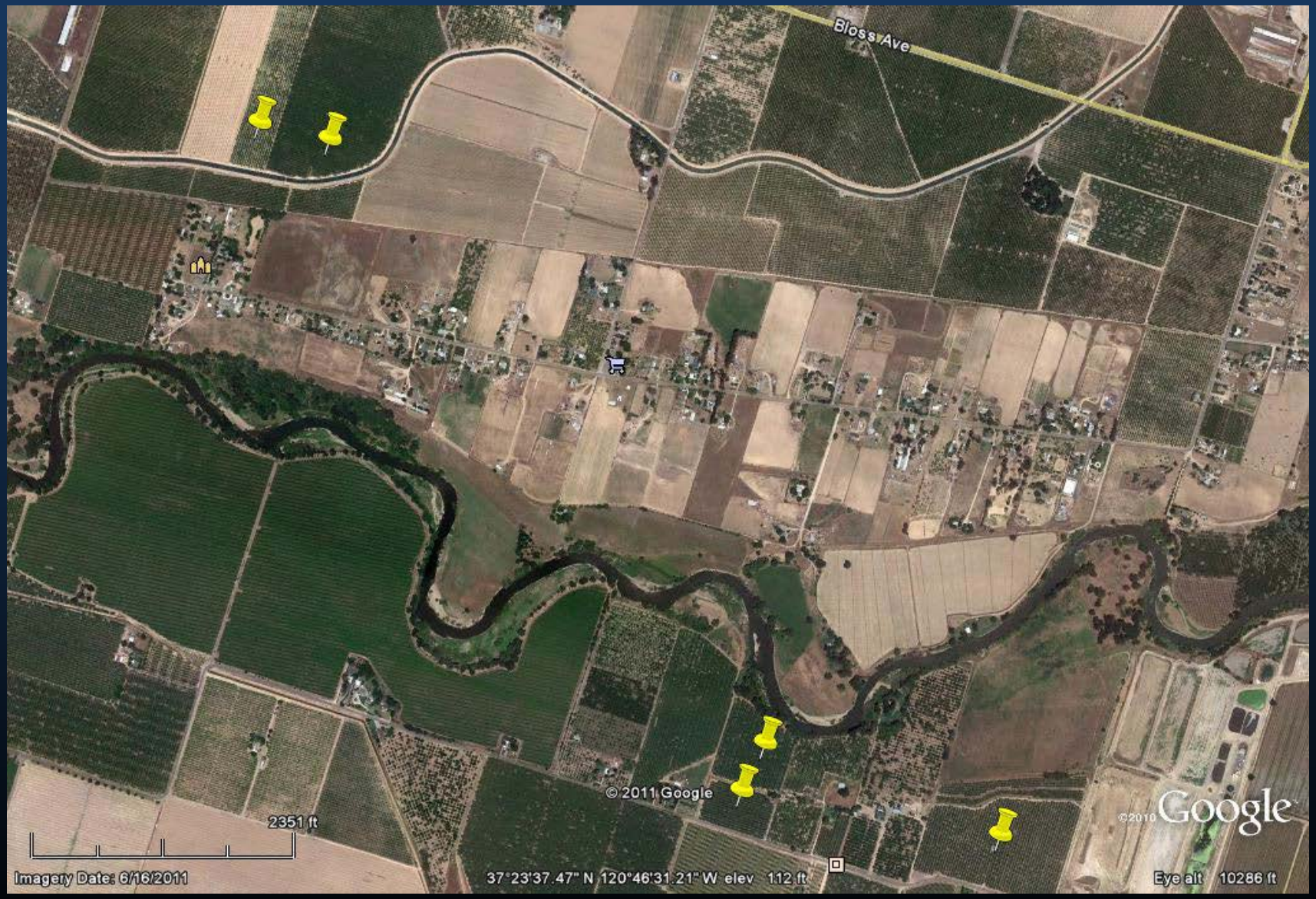
Weakening of scaffolds from fungal infection

Cross-Section Reveals Pathogen

Perennial Scaffold Cankers, *Botryosphaeria/Eutypa spp.*:

Pathogens infect the xylem tissue

Preliminary Epidemiology



Orchard Surveys: Categories

- **Wind Cracks**

Orchard Surveys: Categories

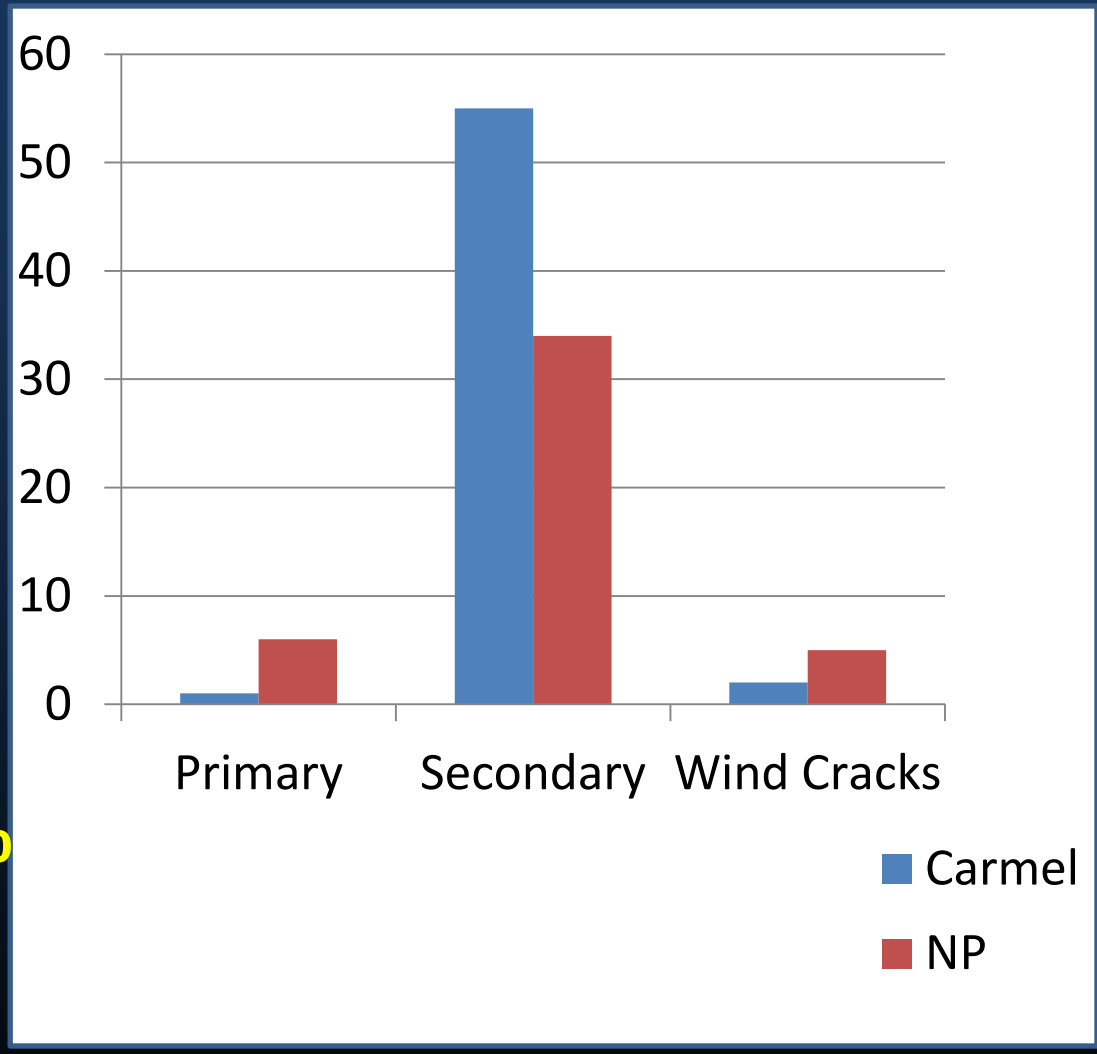
Primary Scaffold Infection

Secondary Scaffold Infection

Merced Orchard #1 and #2

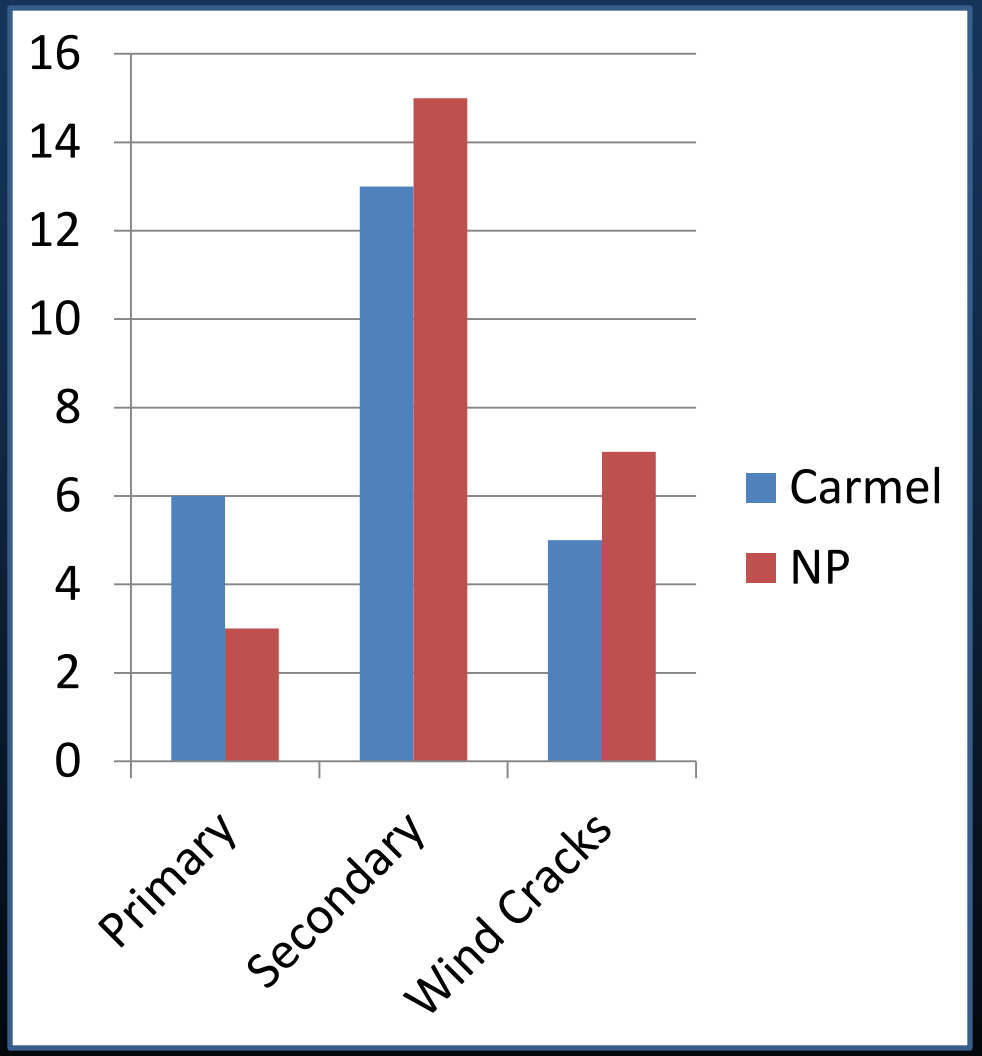
Merced Orchard #1

- 6/6 acres surveyed
- Carmel/NP
- 18 x 22 (110 trees/acre)
- 105 trees affected, 15.8%
- 13.92% Nonpareil, 17.58% Carmel
- 12th leaf orchard, 6% recognized loss



Merced Orchard #2

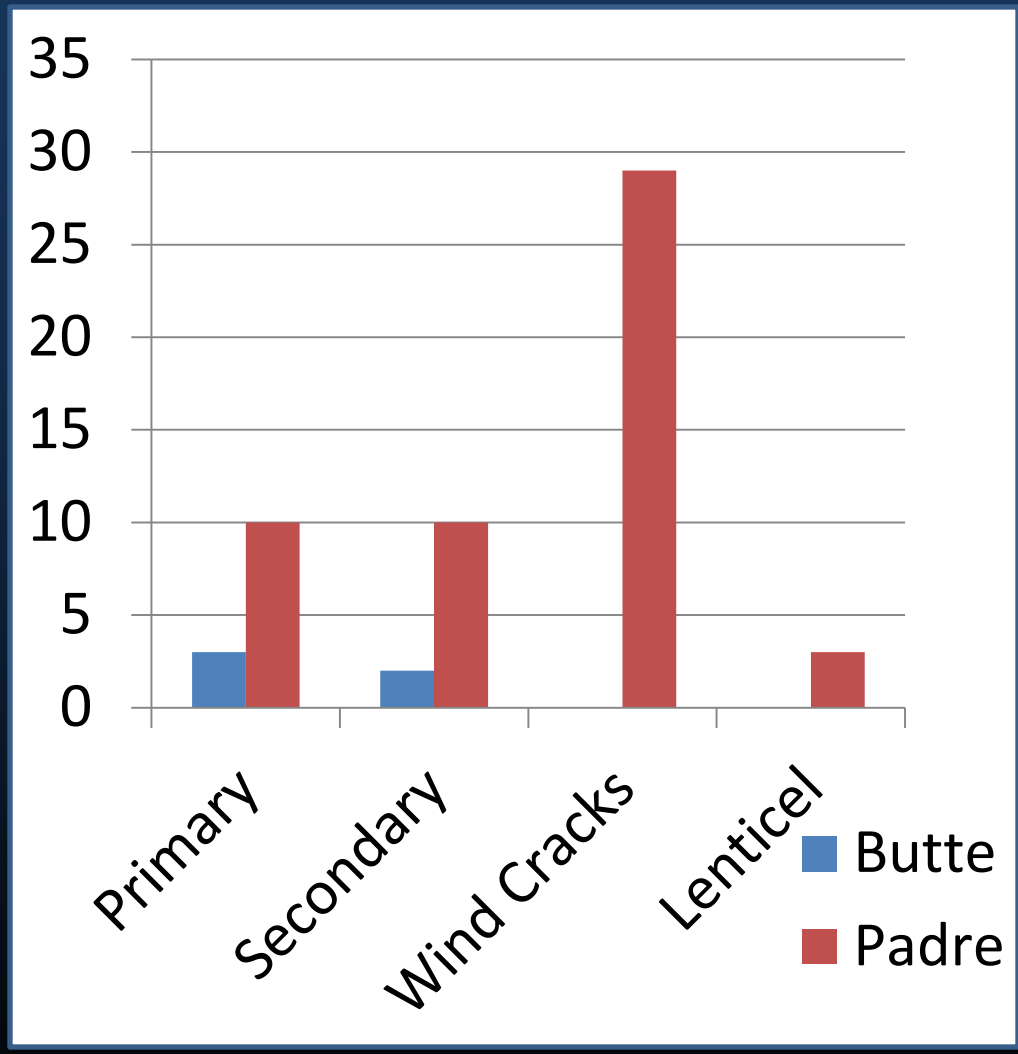
- 5/10 acres Surveyed
- Carmel/NP
- 18 x 22 (110 trees/acre)
- 49 trees affected (8.9%)
- 9% Nonpareil, 8.8% Carmel



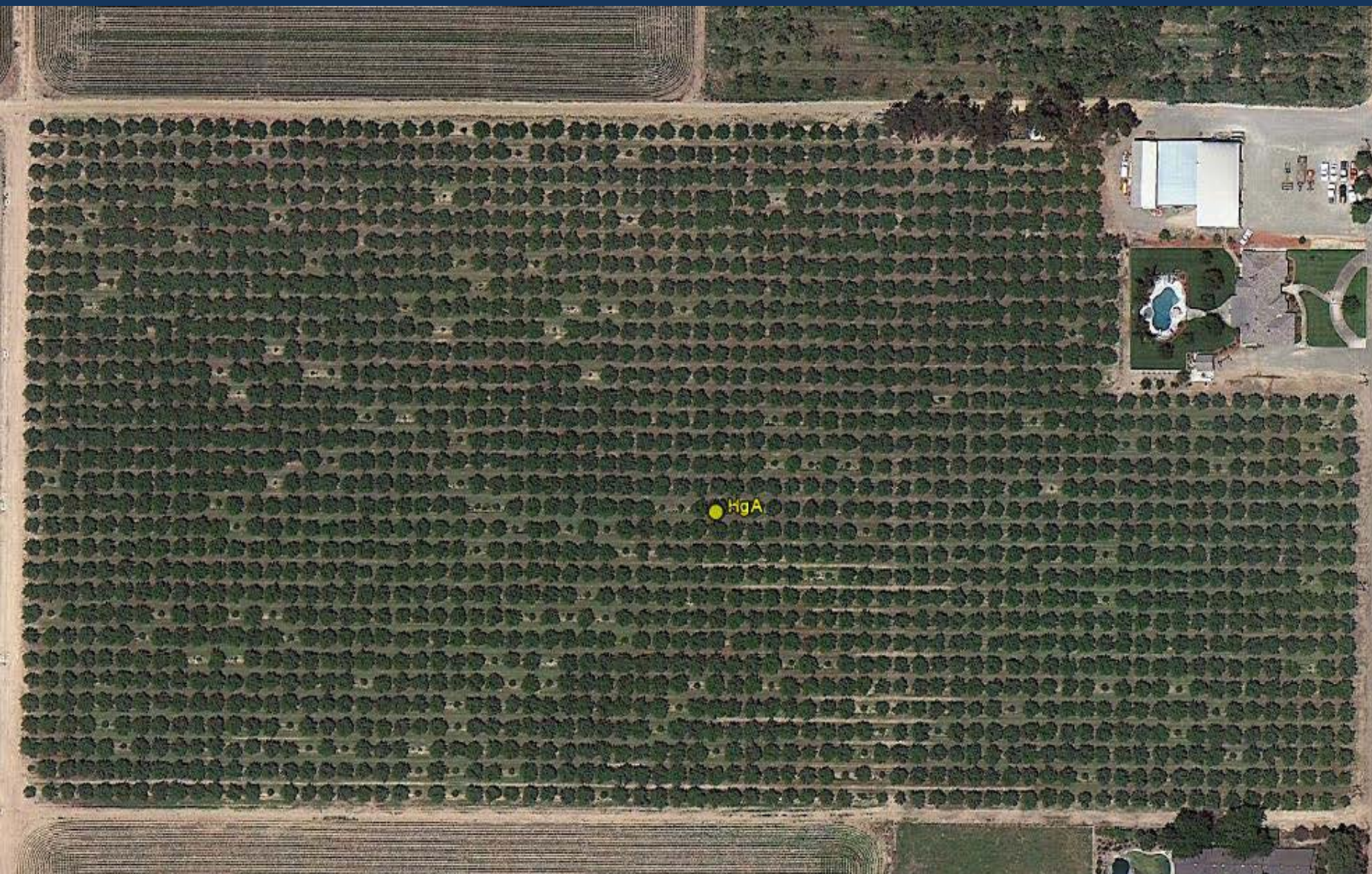
Merced Orchard #3

Merced Orchard #3

- Butte/Padre
- 18 x 21 (110 trees/acre)
- 3/20 acres surveyed
- 57 trees affected – 17.3% of total
- 31.6% Padre; 3% Butte
- 5th leaf orchard, <1% recognized loss



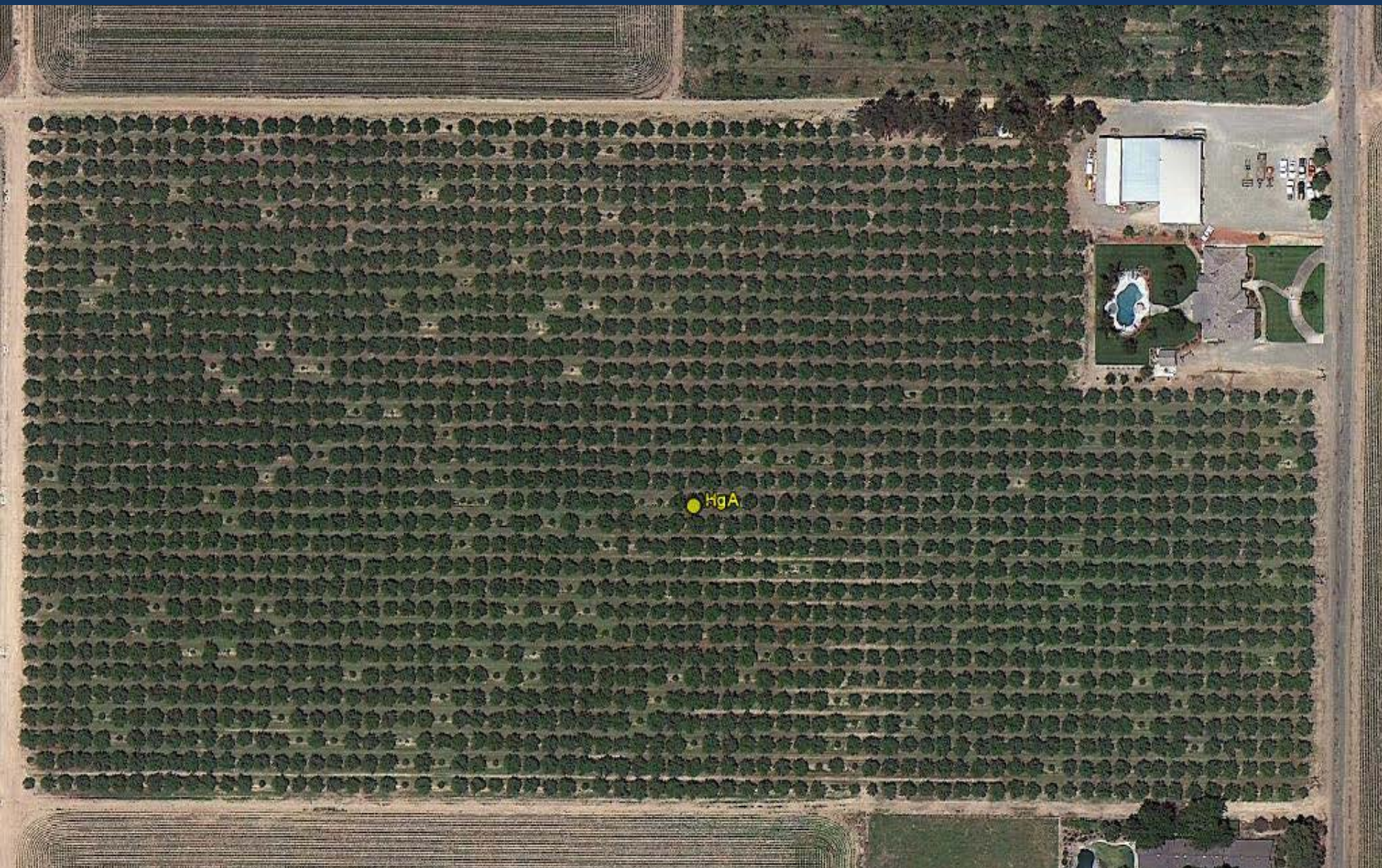
Merced Orchard #4



Merced Orchard #4

- 5th leaf Butte/Padre
- 21 x 18 (115 trees/acre)
- 15/15 acres surveyed
- 116 trees affected - 6.7% of total, all replaced after splitting out in 3rd leaf
- 1.2% Butte, 12.2% Padre
- 92% Primary Pruning Wound Infections

Merced Orchard #4

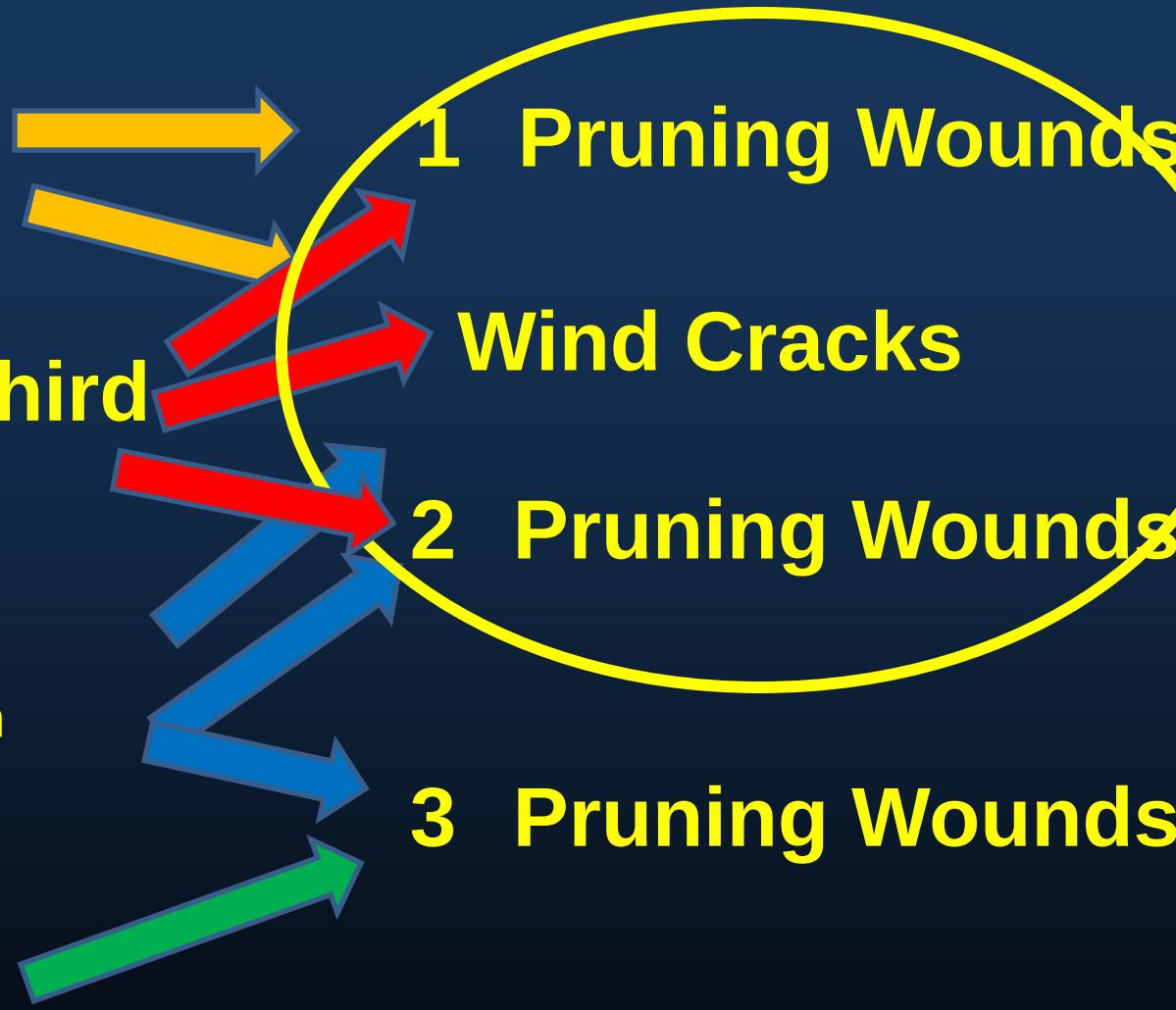


Preliminary Results

- There appears to be varietal differences, but this may be due to tree architecture
- Large cuts made on Primary and Secondary scaffolds are more detrimental to tree longevity
- Proper tree training (4 or fewer scaffolds) and tying is important to avoid wind cracks
- Aldridge, Padre, Fritz, Carmel have more problems than Nonpareil, Butte.

Preliminary Results

- First Leaf
- Second and Third Leaf
- 4th through 7th Leaf
- Mature Trees



“Newly Discovered” Cankers

Preliminary Conclusions

- **Prevention:**
- **Fungicides have proven ineffective, must rely on cultural controls**
- **Wounds can take over 2 weeks to heal**
- **Avoid pruning when rain is forecasted**
  - **Prune early/late**
- **Better scaffold selection**
  - **Multiple scaffolds will be problematic**
- **The smaller the cuts the better**
- **Re-think pushing the tree hard the first few years if planting Padre, Fritz**
  - **Summer scaffold selection for first leaf trees?**