

Walnut Hedgerow Trial on Marginal Soils

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Objectives

- **Evaluate potential for hedgerow English walnuts on marginal soil**
- **Compare performance of NCB and Paradox**
- **Test adaptability of Chandler and Howard to hedgerow system**
- **Assess effect of soil modification on growth and performance**

NICKELS SOIL LABORATORY

LESLIE J. NICKELS TRUST AND
COLUSA COUNTY WATER DISTRICT

IN COOPERATION WITH
THE UNIVERSITY OF CALIFORNIA

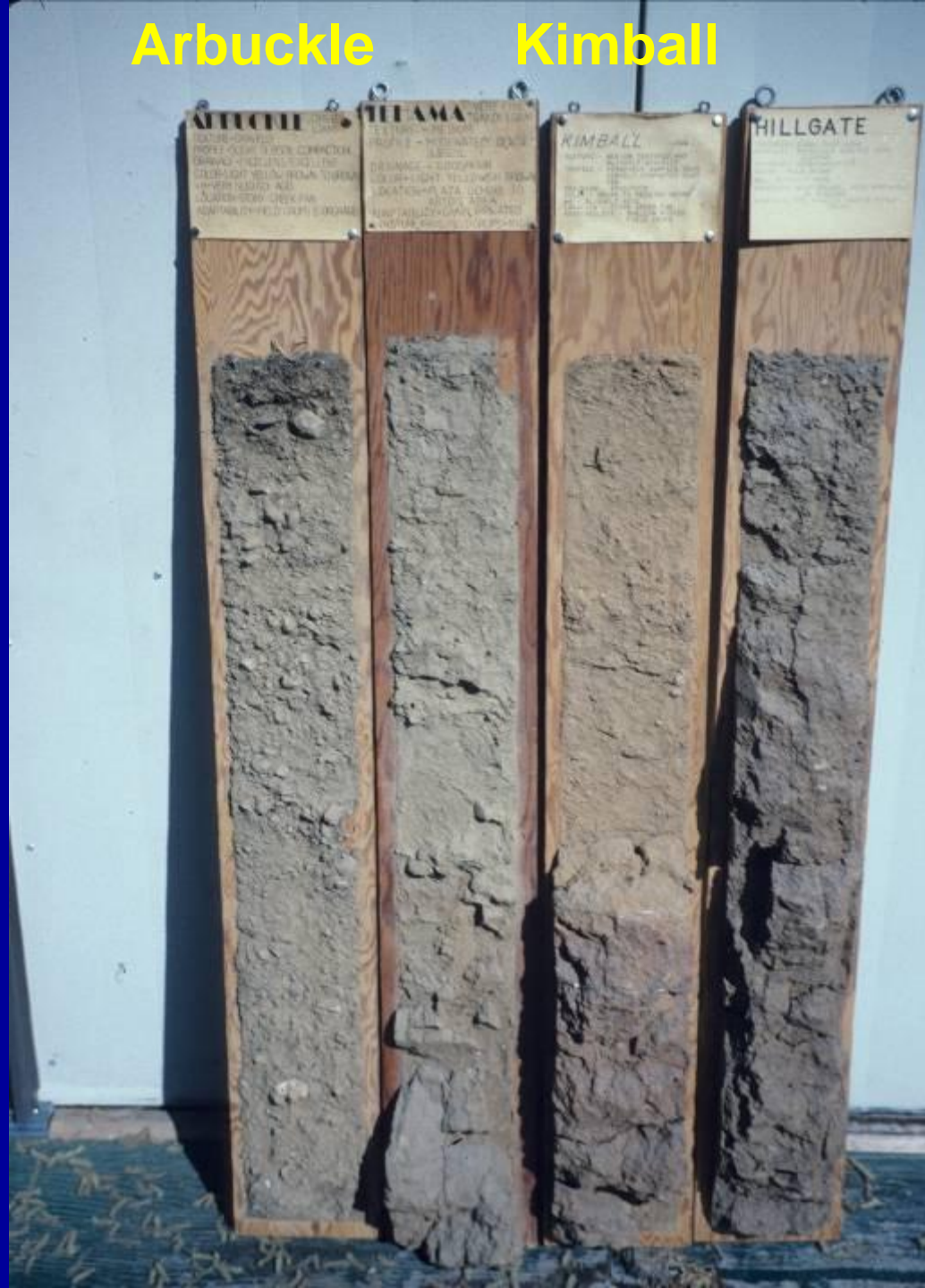
Arbuckle CA

Soils-

Approximately 30%

Arbuckle series-
Class II- gravelly
loam 3-6 ft over
gravel

70% Kimball series-
Class III- silt or
gravelly loam over
clay- 12 to 36 inches



1985

5-6 ft deep

North South

10 ft center

Slip Plow



1986 Planting Nickels Estate, Arbuckle CA

- 12 X 18 north south
- Drip single line=ETo
- Chandler vs. Howard
 - Howard/Paradox field grafted 1987
- Paradox vs. NCB
- 8 tree plots, 6 replicates
- Slip plow vs. undisturbed
- Monthly N
- 400 lbs potassium sulfate, from 1991





Planting Crew

Pruning

Years 1-3 modified
central leader



**Mechanical
pruning-starting
4th dormant**





4th-7th Hedged 4ft from trunk on both sides, topped- ½ of new growth

8th dormant on hedged annually 4 ft. from trunk on Alternate sides

Topped as needed until height was 16 ft.

Discontinued 10th dormant

**Heading required longer
on less vigorous trees**





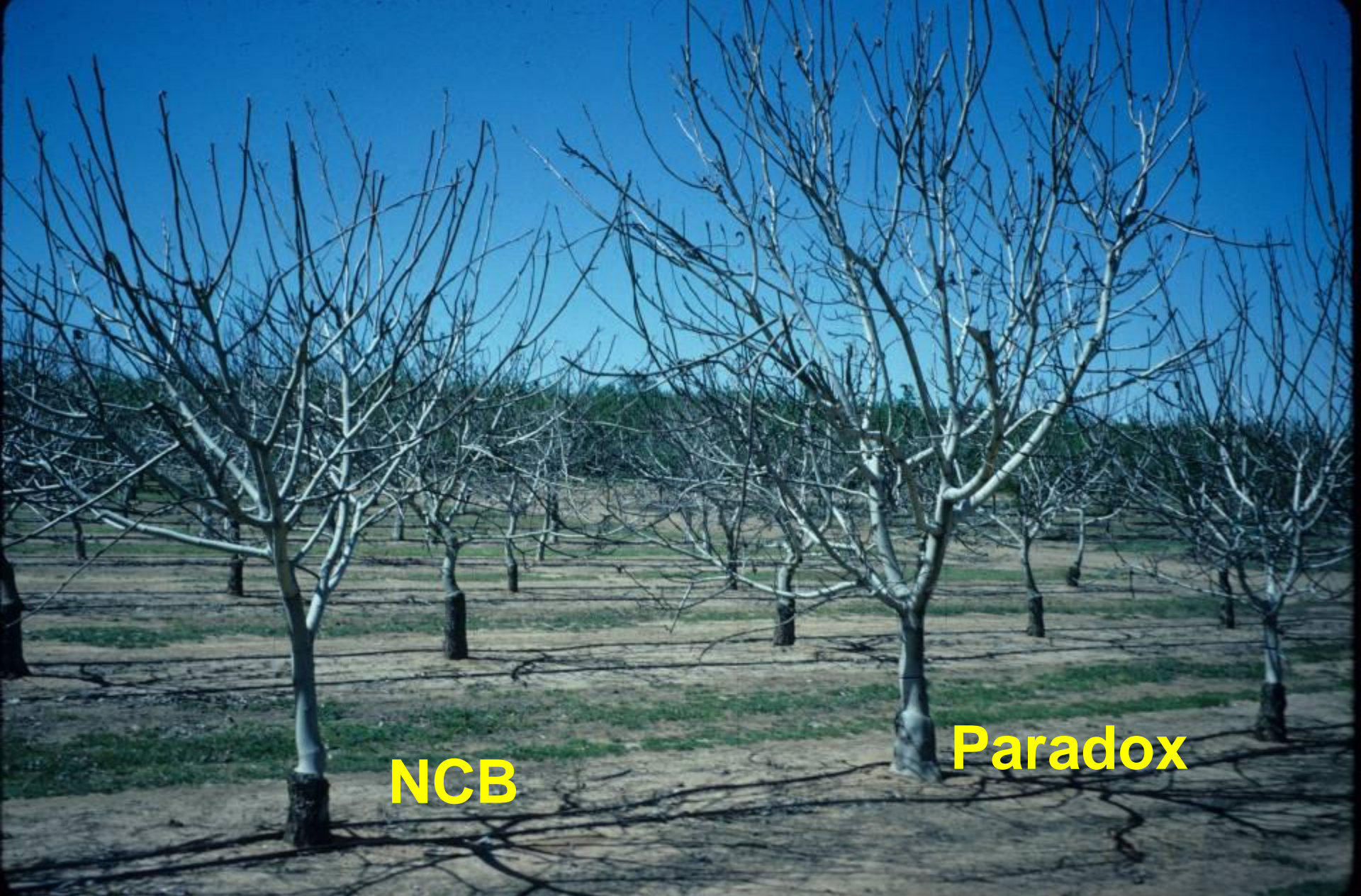
**Due unsatisfactory
growth a second
Drip Line was added
in 1991**





NC Black

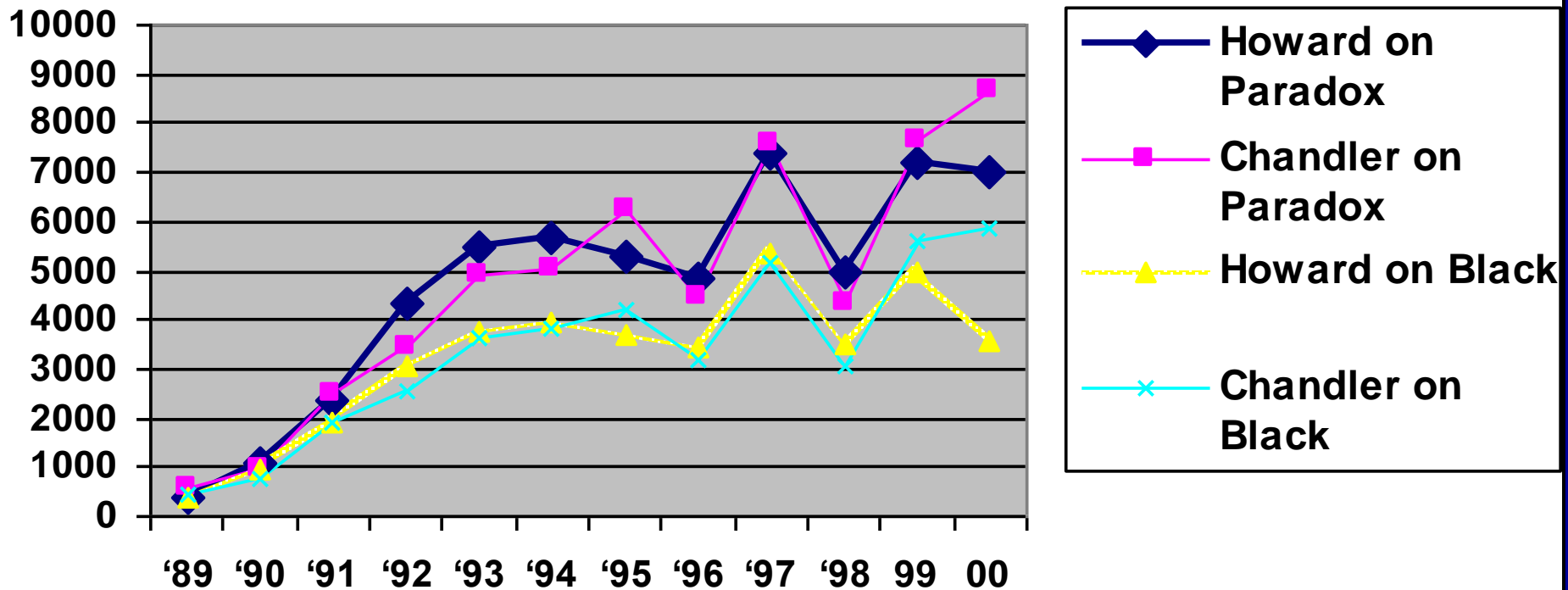
Paradox



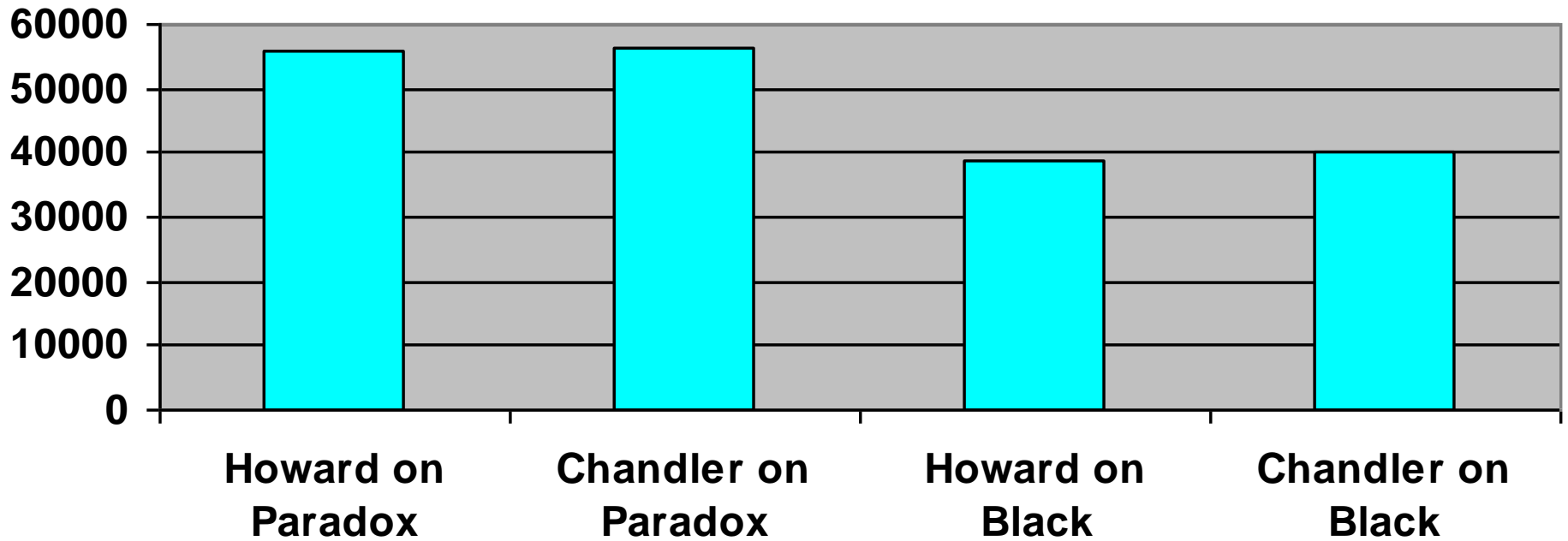
NCB

Paradox

Nickels Hedgerow Annual Yields Pounds/Ac



Accum Yields Nickels Hedgerow Through 15th Year



Nickels Hedgerow - 1999

Tree Size & Yield

| Treatment | Trunk Circ cm | Yield lbs/Ac | Yield Effic. (yield/circ) |
|-----------|---------------|--------------|------------------------------|
| NC Black | 49.4 B | 5296 B | 107 |
| Paradox | 55.1 A | 7424 A | 135 |
| Howard | 48.5 B | 6093 | 127 |
| Chandler | 56.0 A | 6627 ns | 118 |
| Non-Slip | 53.8 | 6870 | 128 |
| Slip | 50.6 | 5849 | 116 |

Kernel Quality

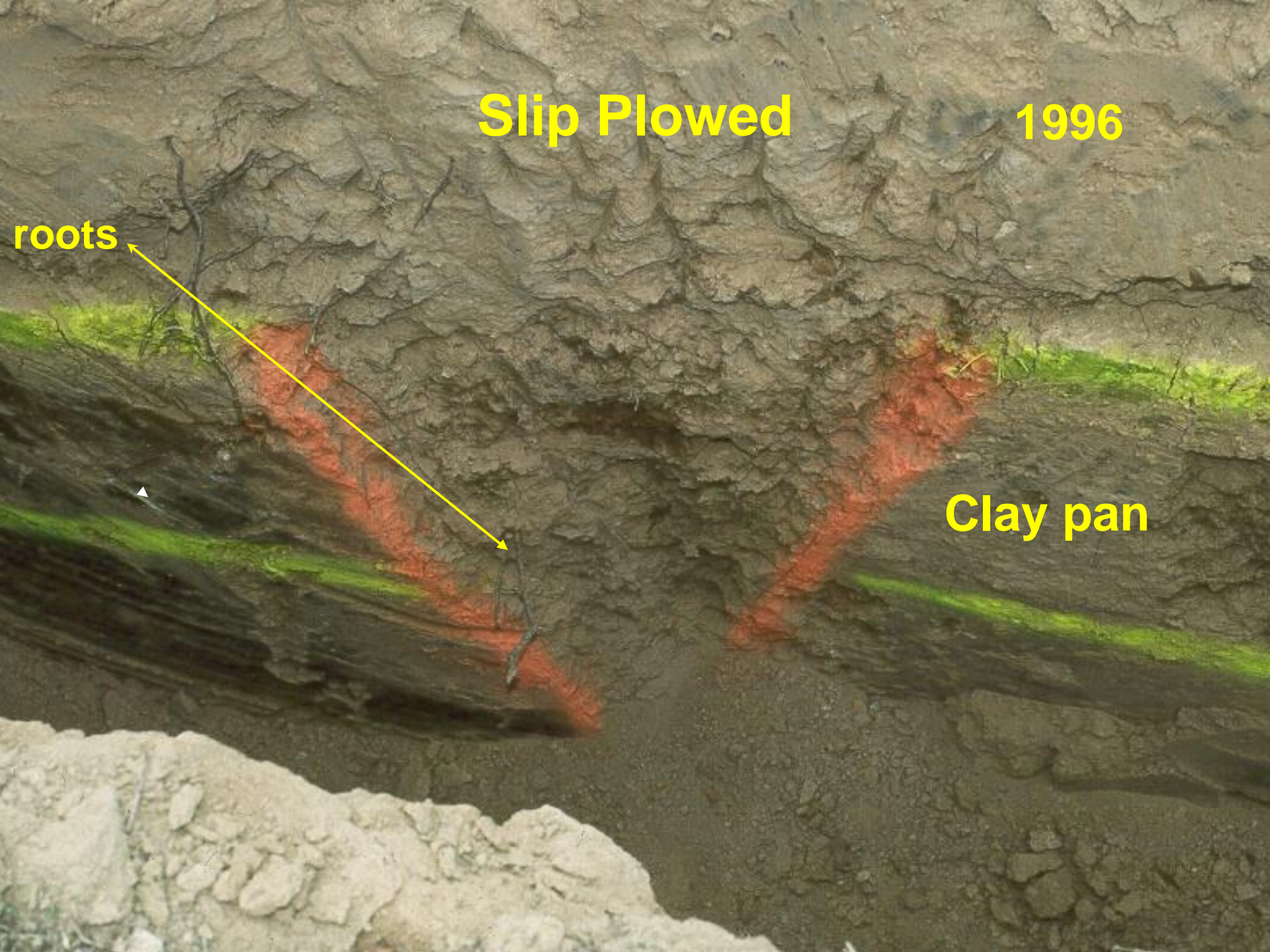
- High commercial quality for all treatments
- Chandler slightly better than Howard- 2% greater edible yield, 2 pts higher RL
- Negligible differences between rootstocks

Slip Plowed

1996

roots

Clay pan





2004

What We Learned

- High yield and quality can be achieved on soils of this type
- Paradox is critical to success on marginal soils
- Adequate irrigation soil coverage is important
- 18 ft between rows is too close- suggest 12-14 ft in row and 20-22 between rows
- Slip plowing is of questionable value under these conditions

Three year pruning cycle thought to be better for Chandler


Explanations

1. Larger trees
2. Moderate vigor at site
3. Annual alternate side hedging

Winter 2011- 25 years

Hedged every other
year
Yield approximately
2 tons per acre
across varieties
and rootstocks





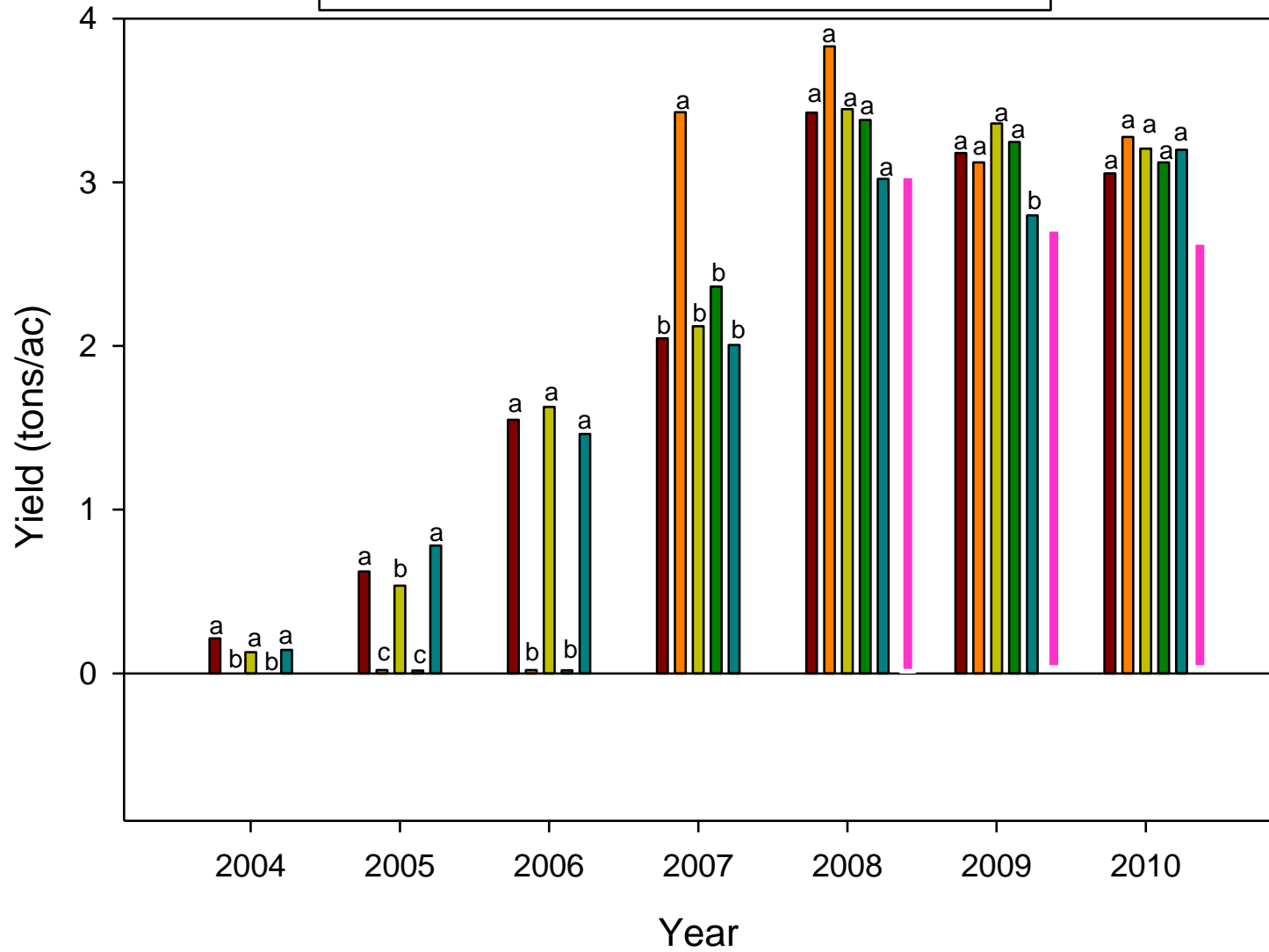
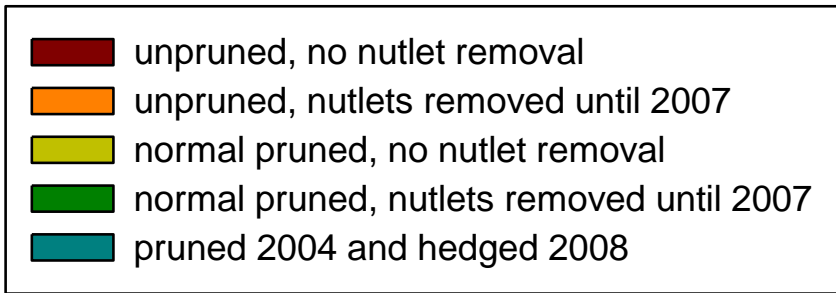
**2. Howard/Paradox Hedge
14' X 20', planted 2001**



Micro sprinklers

Winter 2011 10 Years





Orchard 3. 2008

Design and Pruning treatments

- **Chandler orchard planted at 15 x 22 ft.**
- **Nursery budded on paradox**
- **March 2009 first pruning**
- **Treatments**
 - 1) **Heavily pruned hedgerow**
 - 2) **Minimal hedgerow/low vigor training**
 - 3) **Minimal hedgerow training**
 - 4) **No heading/pruning training**
- **Varieties-Tulare, Ford, Gillet (1 row each)**

Heavy pruning
Unheaded/unpruned



Moderate pruning



Heavy pruning
Unheaded/unpruned



Moderate pruning



Heavy pruning
Unheaded/unpruned



3/29/10

Moderate pruning



3/29/10



3/29/10

Heavy pruning
Unheaded/unpruned



1/24/11

Moderate pruning



1/24/11



1/24/11

Results

Comparing average canopy PAR interception with yield

| Variety | Treatment | July 9, 2010 | | Yield per unit PAR intercepted |
|----------|---------------------------|----------------------|-------------------|--------------------------------|
| | | PAR interception (%) | Yield (tons/acre) | |
| Chandler | <u>Heavily pruned</u> | 17.4 b | 0.14 c | 0.008 c |
| | Minimal/low vigor | 22.4 ab | 0.37 b | 0.016 b |
| | Minimally pruned | 22.3 ab | 0.33 b | 0.014 b |
| | <u>No heading/pruning</u> | 24.1 a | 0.73 a | 0.030 a |
| Tulare | Heavily pruned | 19.9 a | 0.27 a | 0.014 c |
| | Minimally pruned | 19.2 a | 0.47 a | 0.023 b |
| | No heading/pruning | 19.4 a | 0.63 a | 0.033 a |
| Forde | Heavily pruned | 23.4 a | 0.26 b | 0.012 b |
| | Minimally pruned | 21.9 a | 0.55 ab | 0.024 b |
| | No heading/pruning | 23.2 a | 0.92 a | 0.039 a |
| Gillet | Heavily pruned | 19.5 a | 0.23 c | 0.013 c |
| | Minimally pruned | 18.0 a | 0.38 b | 0.020 b |
| | No heading/ pruning | 16.0 a | 0.52 a | 0.032 a |



Heavily pruned

Unheaded/unpruned

Walnut Pruning Field Meeting

**Thursday, March 10, 2011
from 1:30– 3:30 pm in the afternoon**

Location: Nickels Soil Lab, Arbuckle (map on back page) South side of Green Bay Ave. West of Wildwood.

Demonstration of pruning 3 year old hedgerows and conventional planted walnut with a look at two pruning trials for hedgerow Chandler and Howards

The workshop will be conducted by UC Farm Advisors:
Janine Hasey, Sutter & Yuba Counties; Carolyn DeBuse, Yolo & Solano Counties;
Bruce Lampinen, Pomology Specialist, UC Davis; John Edstrom, Colusa County

IN THE EVENT OF RAIN, MEETING WILL BE HELD ON MARCH 11TH 1:30-3:30 PM

Questions: Yolo UCCE OFFICE AT 530-666–8143 or look at the websites for updated information at ceyolo.ucdavis.edu or cesolano.ucdavis.edu